PB-230 013

ILLINOIS RIVER SYSTEM - WATER QUALITY CONDITIONS. PART II. TABLES. CHAPTERS 4 THROUGH 9

Public Health Service
Chicago, Illinois

January 1963

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REPORT

on the

ILLINOIS RIVER SYSTEM

WATER QUALITY CONDITIONS

Part II Tables

Chapters 4 through 9

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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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Great Lakes-Illinois River Basins Project

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CHAPTERS IV - IX

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TABLE IV-1a

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
North Shore Channel	NS 340.7	Sheridan Road	Control works to admit Lake water to Waterway
	NS 338.6	Emerson St.	
	NS 336.9	Oakton St.	Above North Side Treatment Plant
	NS 334.9	W. Devon St.	Below North Side Treatment Plant
	NS 333.4	W. Foster St.	Above confluence with North Branch Chicago River
North Branch Chicago River	NB 333.4	Albany Ave. Footbridge	Above confluence with North Shore Channel
	NB 331.4	W. Addison St.	Below confluence with North Shore Channel
	NB 329.0	N. Ashland Ave.	
	NB 325.8	W. Kinzie St.	Above confluence with Chicago River
Chicago River	CH 326.9	Lake Shore Drive	At Chicago Harbor where Lake water enters Waterway
	CH 325.8	N. Wells St.	Above confluence with North Branch Chicago River
South Branch Chicago River	SB 324.3	W. Roosevelt Road	Below confluence with North Branch Chicago River and Chicago River
	SB 322.8	S. Halsted St.	

TABLE IV-1b

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
Chicago Sanitary and Ship Canal	SS 320.0	S. California Ave.	
	SS 317.3	S. Cicero Ave.	Above Stickney Treatment Plant
	SS 314.0	S. Harlem Ave.	Below Stickney Treatment Plant
	SS 307.9	Wentworth Ave.	
	SS 304.1	Ill. Hwy. No. 83	
	SS 300.5	Stephen St.	Above confluence with Calumet Sag Channel
	SS 296.2	135th St.	
	SS 292.1	Division St.	In Lockport Pool
	SS 291.1	Lockport Dam	Just above Lockport Dam and above confluence with Des Plaines River Sanitary District Control Point
Des Plaines River	DP 292.7	Ill. Hwy. No. 7	Above confluence with Chicago Sanitary and Ship Canal
	DP 285.8	Brandon Road	Below confluence with Chicago Sanitary and Ship Canal and below Brandon Dam (Biological samples in Brandon Pool)
	DP 277.8	U.S. Hwy. No. 66	Midway in Dresden Island Pool and above confluence with Kankakee River.
Kankakee River	KR 278.7	U.S. Hwy. No. 66	Above confluence with DesPlaines River (Biological samples 1/4 mile upstream from Will County Line Bridge)

TABLE IV-1c

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
Illinois River	IR 271.6	Dresden Island Dam	Just below Dresden Island Dam and below confluence of Des Plaines and Kankakee Rivers. (Biological samples in Dresden Pool)
Calumet River	CA 332.6	S. Ewing Ave.	About 0.8 mile downstream from Calumet Harbor, where Lake water enters Waterway.
	CA 328.1	S. Torrence Ave.	Above confluence with Calumet Lake.
	CA 327.0	130th Street	Below confluence with Calumet Lake and above confluence with Grand Calumet River.
Grand Calumet River	GC 325.8	S. Torrence Ave.	Above confluence with Little Calumet River.
Little Calumet River	LC 322.4	S. Indiana Ave.	Below confluence of Calumet and Grand Calumet Rivers.
	LC 320.1	S. Halsted St.	Above Calumet Treatment Plant and confluence with Cal Sag Channel.
	LC 320.0	Ashland Ave.	Above confluence of Little Calumet River and Cal Sag Channel.
Calumet Sag Channel	CS 317.9	S. Western Ave.	Below confluence of Little Calumet River and Cal Sag Channel and Calumet Treatment Plant effluent.

TABLE IV-1d

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
Calumet Sag Channel	CS 314.9	S. Cicero Ave.	
	CS 311.5	S. Harlem Ave.	
	CS 308.4	U.S. Hwy. No. 45	
	CS 304.1	Ill. Hwy. No. 83	Above confluence with Sanitary and Ship Canal
DuPage River	DPR 280.8	Dirst Bridge	Near Minooka
Illinois River	IR 270.6	EJ&E RR Bridge	
	IR 263.5	Ill. Hwy. No. 47	At Morris, Ill.
	IR 252.7	Ill. Hwy. No. 170	At Seneca, Illinois
	IR 246.9 (1)	Marseilles Hwy. Bridge	Marseilles Rapids - Downstream sample
	IR 246.9 (2)	Marseilles Hwy. Bridge	Marseilles Canal - Upstream sample
	IR 240.2	Scherer Island	Above confluence with Fox River
Fox River	FR 241.1	U.S. Hwy. No. 6	At Ottawa, Illinois
Illinois River	IR 239.2	Hitt Island	Below confluence with Fox River
	IR 231.6	Starved Rock Light & Daymark	
	IR 229.7	Utica Bridge Light	Above confluence with Vermillion River
Vermillion River	VR 236.5	Ill. Hwy. No. 178	At Lowell, Illinois
Illinois River	IR 219.8	Huse Slough Light	This station was sampled during Nov., 1961 and was dropped from program later
	IR 209.4	Bureau Creek Light & Daymark	
	IR 198.1	Websters Landing Light & Daymark	This station was sampled during Nov., 1961 and was dropped from program later
	IR 184.8	Bennetts Landing Light	

TABLE IV-1e

SAMPLING STATIONS

Stream	Station River Mile	Location	Remarks
Illinois River	IR 181.3	Chillicothe Upper Light	This station was sampled during Nov., 1961 and was dropped from program later. Biological samples still taken at this point.
	IR 173.4	Blue Creek Point Light	
	IR 168.9	Drolls Point Light	This station was sampled during Nov., 1961 and was dropped from program later.
	IR 166.1	Peoria Water Intake	
	IR 165.3	Avery Light	This station was sampled during Nov., 1961 and was dropped from program later. Biological samples still taken at this point.
Kickapoo Creek	KC 161.7	U.S. Hwy. No. 24	At Peoria, Ill.
Illinois River	IR 158.7	Warning Sign - Peoria Lock & Dam 1 mile	
	IR 156.5	Seven Mile Island Light & Daymark	
Mackinaw River	MR 161.0	Ill. Hwy. No. 29 at Green Valley, Ill.	
Illinois River	IR 151.8	Pekin Water Intake	This station was sampled during Nov., 1961 and was dropped from program later. Biological samples still taken at this point.
	IR 143.2	Lancaster Landing Light	
	IR 132.0	Woodyard Light & Daymark	This station was sampled during Nov., 1961 and was dropped from program later.

TABLE IV-1f

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
Illinois River	IR 125.8	Daymark and Thompson Lake Slough Light	Below confluence with Big Sister Creek.
Spoon River	SR 133.7	U.S. Hwy. No. 24	At Duncans Mill, Illinois.
Illinois River	IR 117.6	Havana Light	This station was sampled Nov., 1961 and was dropped from program later. Biological samples still taken here.
	IR 105.5	Grand Island Bend Light and Daymark	
Sangamon River	SR 105.7	Ill. Hwy. No. 78	At Chandlerville, Ill.
Illinois River	IR 100.9	Hickory Island Light and Daymark	This station was sampled Nov., 1961 and was dropped from program later.
	IR 88.0	U.S. Hwy. No. 67	
LaMoine River	LR 95.8	U.S. Hwy. No. 24	At Ripley, Ill.
Illinois River	IR 81.0	LaGrange Daymark	
	IR 78.6	Indian Creek Light & Daymark	Below confluence with Indian Creek.
	IR 71.2	Ill. Hwy. No. 104	At confluence with Meredosia Lake.
	IR 55.9	Ill. Hwy. No. 100	Near Florence, Ill.
Macoupin Creek	Mc 23.7	Macoupin Creek Bridge	At Spankey, Ill.
Illinois River	IR 21.7	Ill. Hwy. No. 100	At Hardin, Ill.

TABLE IV-1g

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
Grand Calumet River	GC 344.8	Virginia St.	
	GC 336.0	Industrial Hwy.	
	GC 332.2	Kennedy Ave.	Above confluence with Indiana Harbor Canal.
	GC 331.1	Indianapolis Blvd.	Above confluence with Indiana Harbor Canal.
	GC 328.7	Hohman Ave.	
	GC 326.6	Burnham Ave.	
	GC 325.8	Torrence Ave.	Above confluence with Little Calumet River.
Indiana Harbor Canal	IH 331.9	151st St.	Below confluence with Lake Calumet and above confluence with Grand Calumet River.
Little Calumet River	LC 322.4	Indiana Ave.	Above outfall of Calumet Treatment Plant.
	LC 320.1	Halsted St.	Above confluence of South Branch of Little Calumet River.
	LC 319.7	Ashland Ave.	Above confluence of East Branch of Little Calumet River.
	LC 320.2	Ashland Ave.	Above confluence of East Branch of Little Calumet River.
	LC 323.4	Halsted St.	
	LC 325.0	Indiana Ave.	
	LC 328.0	159th St.	Below confluence with Thorn Creek.
	LC 330.0	Torrence Ave.	Above confluence with Thorn Creek.
	LC 333.1	Hohman Ave.	

TABLE IV-1h

SAMPLING STATIONS

Stream	Station River Miles	Location	Remarks
	LC 334.9	Columbia Ave.	Below confluence with Hart Ditch
	LC 337.2	Kennedy Ave.	Above confluence with Hart Ditch
	LC 351.1	Georgia Ave.	
Calumet Sag Channel	CS 317.9	Western Ave.	Below confluence of East and South Branches of Little Calumet River
Hart Ditch	HD 336.7	Ridge Road	Above confluence with Little Calumet River
Thorn Creek	TC 330.3	167th St.	Above confluence with Little Calumet River
Calumet River	CA 327.0	130th St.	Below confluence with Lake Calumet and above confluence with Grand Calumet River

TABLE IV-2a

SAMPLING STATIONS - PHYSICAL OBSERVATIONS

Stream	Station River Miles	Location	Remarks
North Shore Channel	NS 340.7	Sheridan Road	Clean
	NS 338.6	Emerson Street	Clean
	NS 336.9	Oakton Street	Clean
	NS 334.9	W. Devon Street	Bubbles, Rubbish, Garbage
	NS 333.4	W. Foster St.	Bubbles, Rubbish, Garbage
North Branch Chicago River	NB 333.4	Albany Ave. Foot Bridge	Clean
	NB 331.4	W. Addison St.	Bubbles, Rubbish, Garbage
	NB 329.0	N. Ashland Ave.	Bubbles, Rubbish, Garbage, Oil
	NB 325.8	W. Kinzie St.	Rubbish, Oil
	CH 326.9	Lake Shore Drive	
	CH 325.8	N. Wells Street	Oil
South Branch Chicago River	SB 324.3	W. Roosevelt Road	Rubbish, Oil
	SB 322.8	S. Halsted St.	Rubbish, Oil
Chicago Sanitary and Ship Canal	SS 320.0	S. California Ave.	Rubbish, Oil
	SS 317.3	S. Cicero Ave.	Rubbish, Oil
	SS 314.0	S. Harlem Ave.	Rubbish, Oil
	SS 306.9	Wentworth Ave.	Rubbish, Oil
	SS 304.1	Ill. Hwy. No. 83	Rubbish, Oil
	SS 300.5	Stephen Street	Rubbish, Oil
	SS 296.2	135th Street	Bubbles, Rubbish, Oil
	SS 292.1	Division Street	Bubbles, Rubbish, Oil
	SS 291.1	Lockport Dam	Bubbles, Rubbish, Oil

TABLE IV-2b

SAMPLING STATIONS - PHYSICAL OBSERVATIONS

Stream	Station River Miles	Location	Remarks
DesPlaines River	DP 292.7	Ill. Hwy. No. 7	Rubbish
	DP 285.8	Brandon Road	Rubbish, Garbage, Oil, Det. Suds
	DP 277.8	U.S. Hwy. No. 66	Rubbish, Oil
Kankakee River	KR 278.7	U.S. Hwy. No. 66	Rubbish
Illinois River	IR 271.6	Dresden Island Dam	Rubbish, Garbage, Oil, Det. Suds
Calumet River	CA 332.6	So. Ewing Ave.	Rubbish, Oil
	CA 328.1	So. Torrence Ave.	Oil
	CA 327.0	130th Street	
Grand Calumet River	GC 325.8	So. Torrence Ave.	Rubbish, Oil
Little Calumet River	LC 322.4	So. Indiana Ave.	Oil
	LC 320.1	So. Halsted St.	Oil
	LC 320.0	Ashland Ave.	Oil
Calumet Sag Channel	CS 317.9	So. Western Ave.	Rubbish, Garbage, Oil
	CS 314.9	So. Cicero Ave.	Rubbish, Oil
	CS 311.5	So. Harlem Ave.	Rubbish, Oil
	CS 308.4	U.S. Hwy. No. 45	Rubbish, Oil
	CS 304.1	Ill. Hwy. No. 83	Rubbish, Oil
DuPage River	DPR 280.8	Dirst Bridge	Rubbish
Illinois River	IR 270.6	EJ&E RR Bridge	Rubbish, Oil, Det. Suds, Vegetation
	IR 263.5	Ill. Hwy. No. 47	Rubbish
	IR 252.7	Ill. Hwy. No. 170	Rubbish, Oil, Vegetation

TABLE IV-2c

SAMPLING STATIONS - PHYSICAL OBSERVATIONS

Stream	Station River Miles	Location	Remarks
Illinois River	IR 246.9 (1)	Marseilles Hwy. Br.	Rubbish, Oil
	IR 246.9 (2)	Marseilles Hwy. Br.	Clean
	IR 240.2	Scherer Island	
Fox River	FR 241.1	U.S. Rte. No. 6	Rubbish, Det. Suds, Vegetation
Illinois River	IR 239.2	Hitt Island	
	IR 231.6	Starved Rock Light and Day Mark	Vegetation
	IR 229.7	Utica Bridge Light	Det. Suds, Vegetation
Vermillion River	VR 236.5	Ill. Hwy. No. 178	Det. Suds, Vegetation
Illinois River	IR 219.8	Huse Slough Light No. 219.8	Det. Suds, Vegetation
	IR 209.4	Bureau Creek Light	Clean
	IR 198.1	Websters Landing	Clean
	IR 184.8	Bennetts Landing Light	
	IR 181.3	Chillicothe Upper Light No. 181.3	
	IR 173.4	Bluecreek Point Lt.	
	IR 168.9	Drolls Point Light No. 168.9	Clean
	IR 166.1	Peoria Water Intake	
	IR 165.3	Avery Light No. 165.3	
Kickapoo Creek	KC 161.7	U.S. Hwy. No. 24	Rubbish
Illinois River	IR 158.7	Warning Sign-Peoria Lock and Dam 1 mile	Clean
	IR 156.5	Seven mile Light and Marker	Clean

TABLE IV-2d

SAMPLING STATIONS - PHYSICAL OBSERVATIONS

Stream	Station River Miles	Location	Remarks
Mackinaw River	MR 161.0	Ill. Hwy. No. 29	Clean
Illinois River	IR 151.8	Pekin Water Intake	
	IR 143.2	Lancaster Landing Lt.	Clean
	IR 132.0	Woodyard Light & Day Mark	
	IR 125.8	Thompson Lake Light	Clean
Spoon River	SR 133.7	U.S. Route No. 24	Det. Suds
Illinois River	IR 117.6	Havana Island Light No. 117.6	
	IR 105.5	Grand Island Bend Marker	Clean
Sangamon River	SR 105.7	Ill. Route No. 78	Det. Suds
Illinois River	IR 100.9	Hickory Island Light and Day Mark	
	IR 88.0	U.S. Hwy. 67 & Ill. 100 - Beardstown Br.	Clean
LaMoine River	LR 95.8	U.S. Route No. 24	Det. Suds, Vegetation
Illinois River	IR 81.0	LaGrange Day Mark	Clean
	IR 78.6	Indian Creek Light	Det. Suds
	IR 71.2	Meredosia Bridge-Ill. Hwy. No. 104	Det. Suds
	IR 55.9	Florence Bridge-Ill. Hwy. No. 100-U.S. 36-54	Clean
Macoupin Creek	MC 23.7	Spankey, Ill., Macoupin Creek Bridge	Rubbish
Illinois River	IR 21.7	Ill. Hwy. 100-Hardin Br.	Clean

TABLE V-1a

ORGANIC CHEMICALS

Results expressed in micrograms per liter (ppb)

SAMPLING PERIOD Start	Stop	FLOW Gallons Filtered	EXTRACTABLES Total	Chloroform	Alcohol
WILMETTE SAMPLING STATION					
7/17/62	7/25/62	5647	225	37	188
7/25/62	8/1/62	4808	309	31	278
8/1/62	8/8/62	5032	224	40	184
8/15/62	8/22/62	5043	217	22	195
LOCKPORT SAMPLING STATION					
7/6/62	7/18/62	8595	397	144	253
7/19/62	7/25/62	4320	697	247	450
8/7/62	8/14/62	4755	451	121	330
8/14/62	8/21/62	4983	714	249	465
PEORIA SAMPLING STATION - Water Works Intake (*Obtained from SEC - NWQN)					
11/28/61	12/5/61	5003	174	38	136
1/2/62	1/10/62	4922	284	81	203
2/5/62	2/13/62	4990	243	90	153
3/5/62	3/13/62	4876	229	78	151

*National Water Quality Network Studies, Cincinnati, Ohio

TABLE V-1b
ORGANIC CHEMICALS
Results expressed in micrograms per liter (ppb)

Sampling Period		CHLOROFORM EXTRACTABLES										
				NEUTRALS								
Start	Stop	Ether Insolubles	Water Solubles	Total	Ali-phatics	Aro-matics	Oxygen-ated	Loss	Weak Acids	Strong Acids	Bases	Loss
WILMETTE SAMPLING STATION												
7/17/62	7/25/62	1	9	16	5	2	9	0	4	2	1	5
7/25/62	8/1/62	1	8	12	2	2	8	0	4	1	1	4
8/1/62	8/8/62	3	10	13	3	2	7	1	6	2	1	5
8/15/62	8/22/62	1	5	9	2	2	5	0	3	1	0	3
LOCKPORT SAMPLING STATION												
7/6/62	7/18/62	4	19	64	18	13	31	2	12	10	1	34
7/19/62	7/25/62	15	37	106	29	21	51	5	20	25	5	19
8/7/62	8/14/62	9	19	56	20	13	19	4	9	18	2	9
8/14/62	8/21/62	3	32	133	54	27	41	11	19	30	4	28
PEORIA SAMPLING STATION - Water Works Intake (*Obtained from SEC - NWQN)												
11/28/61	12/5/61	0	6	23	3	2	17	1	4	1	1	3
1/2/62	1/10/62	2	14	45	3	4	35	3	9	3	2	6
2/5/62	2/13/62	4	18	26	2	3	20	1	7	4	2	29
3/5/62	3/13/62	0	10	41	3	4	33	1	9	3	2	13

*National Water Quality Network Studies, Cincinnati, Ohio

TABLE V-2

RADIATION PROTECTION GUIDES
Daily Intake in Micromicrocuries Per Day

Radionuclide	Iodine 131	Strontium 89	Strontium 90	Radium 226
Range I	0-10	0-200	0-20	0-2*
Range II	10-100	200-2000	20-200	2-20*
Range III	100-1000	2000-20,000	200-2000	20-200*

*Radium results in micromicrograms per day

TABLE V-3
NUCLEAR REACTORS
UPPER ILLINOIS RIVER SYSTEM[1]

NAME	TYPE	KWT	START UP
Argonne National Laboratory Lemont, Illinois			
Argonne Research Reactor (CP-5)	Heavy Water	5,000	1954
Experimental Boiling Water Reactor(EBWR)	Boiling Water	100,000	1956
Argonne Nuclear Assembly for University Training, Argonaut (CP-11)	Graphite/Water	10	1957
Argonne National Laboratory (AGN-201-108)	Homo. Solid	Neg	1957
Argonne National Laboratory (Juggernaut)	Graphite/Water	250	1962
Biological Research Reactor (JANUS)	Tank	200	1962
Armour Research Foundation Chicago, Illinois (ARR)	Homogeneous	75	1956
Dresden Nuclear Power Station (Commonwealth Edison Company) Morris, Illinois	Boiling Water	629,000	1959

[1]U.S. Atomic Energy Commission, Nuclear Reactors Built, Being Built, or Planned in the U.S. as of June 30, 1962, TID-8200 (6th Rev.), USAEC Div. of Technical Information, Oak Ridge (1962).

TABLE V-4a
RADIOACTIVITY LEVELS
ILLINOIS RIVER SYSTEM
July-September, 1962

STATION	uuc/liter S.S.	uuc/liter D.S.	uuc/gram BOTTOM MUD	uuc/gram ALGAE	uuc/liter S.S.	uuc/liter D.S.	uuc/gram BOTTOM MUD	uuc/gram ALGAE
NS 340.7	2.8	5.6		260	0.3	0.4		0.0 (a)
338.6	2.8	6.0	22	110	0.3	0.0	4.8	0.1 (a,b)
336.9	1.2	3.4	84	660	1.1	1.0	3.4	0.0 (a)
334.9	0.0	3.0	27	650	0.4	0.5	0.5	0.0 (a)
333.4	3.4	4.8	9.9	690	0.4	0.3	5.7	4.0 (c)
NB 333.4	8.6	43	370	730	0.1	0.0	1.0	0.5 (c)
331.4	18	10	73	330	(1)	0.3	0.9	0.3 (c)
329.0	46	12	110	160	0.1	0.6	4.8	0.0 (e)
325.8	15	12	25	800	0.4	0.9	4.0	0.0 (c)
CH 326.9	5.6	13	76	300	1.0	0.3	5.3	0.0 (a)
325.8	4.1	18	69	600	0.1	0.0	3.2	0.0 (a)
SB 332.8	2.8	5.2	130	270	0.4	0.0	2.9	2.4 (d)
324.3	2.4	6.0	130	330	1.2	0.0	6.2	0.0 (c)
SS 320.0	7.2	8.4	36	190	0.0	0.0	1.4	0.7 (d)
317.3	6.0	9.2	33	250	0.0	0.4	0.6	9.0 (e,g)
314.0	8.4	9.2	73	28	0.4	0.0	4.1	1.1 (j)
307.9	2.8	12	130	180	0.0	0.1	4.2	0.0 (c,d)
304.1	3.4	10	19	200	0.2	0.8	2.8	0.0 (c)
CA 332.7	1.0	6.6	19	420	0.2	0.1	1.3	0.0 (a)
328.1	1.6	0.4		69	0.2	1.1		1.7 (c,h)
327.0	8.6	4.8	19	48	0.8	0.2	2.9	1.5 (e,g)
GC 336.0	4.4	6.4	14		0.6	0.3	2.0	
332.2	2.0	8.6	11		1.2	0.0	5.5	
IH 331.9	4.0	6.8	14	270	0.4	0.0	0.7	
GC 331.1	1330	20	370		0.0	0.0	6.6	
328.7	19	12	60		0.2	0.0	0.0	
326.6	53	20	22		0.0	0.2	0.4	
325.8	6.6	4.8	11	270	0.2	0.0	0.7	0.7 (g,h)
LC 334.9	21	17	84		0.5	1.1	1.7	
333.1	6.4	17	220		0.0	0.6	0.3	
330.0	9.4	28	110		0.0	0.0	4.6	
328.0	4.4	14	90		0.6	0.0	2.8	
325.0	5.4	12	0.0		0.2	0.0	0.3	
323.4	35	13	210		0.1	0.0	5.9	
322.4	3.8	5.6	18	140	1.1	0.0	3.8	0.0
320.2	22	13	67	160	0.0	0.5	1.8	3.4 (g)
320.1	0.4	7.2	31		0.5	0.0	2.8	
TC 330.3	0.2	12	16		0.4	0.0	1.9	
HD 336.7	0.0	6.0			0.6	0.9		

TABLE V-4b
RADIOACTIVITY LEVELS
ILLINOIS RIVER SYSTEM
JULY-SEPTEMBER, 1962

STATION		BETA ACTIVITY uuc/liter S.S	BETA ACTIVITY uuc/liter D.S	BETA ACTIVITY uuc/gram BOTTOM MUD	BETA ACTIVITY uuc/gram ALGAE	ALPHA ACTIVITY uuc/liter S.S	ALPHA ACTIVITY uuc/liter D.S	ALPHA ACTIVITY uuc/gram BOTTOM MUD	ALPHA ACTIVITY uuc/gram ALGAE
CS	317.9	0.0	3.0			0.9	0.9		
	314.9	0.6	2.6		150	0.6	1.2		0.0(c,i)
	311.5	0.0	4.0		33	0.5	0.7		0.1(f)
	308.4	31.	7.0	0.0	140	0.8	0.9	2.8	2.1(d,f)
	304.1	0.0	2.2		87	0.2	0.3		0.0(d)
SS	300.5	4.6	7.0		270	0.3	0.4		1.4(g,h)
	296.2	0.0	6.2		170	1.3	1.1		2.9(h)
	292.1	2.4	7.4	40	120	0.1	0.1	4.5	0.9(h)
	291.1	9.2	6.6	130	140	0.0	0.0	2.7	3.4(d)
DP	292.7	7.6	18	94		0.0	0.9	7.1	
	285.8	1.2	7.2		150	0.8	0.7		1.0
	278.0	2.2	5.8	31	160	1.0	0.2	9.4	7.4
	277.5	0.0	3.4			0.4	0.0		
DuPage	280.8(2)	21	20			0.6	0.0		
Kankakee	278.7(3)	30	14			1.8	2.0		
IR	271.6(3)	58	36			1.2	2.4		
	270.6(2)	16	23			0.6	0.5		
	263.5(2)	11	21			1.3	0.5		
	252.7(2)	11	26			0.8	0.3		
	246.9u(2)	15	23			0.9	0.6		
	246.9d(2)	15	22			0.8	0.4		
Fox R.	241.1(2)	12	23			1.0	1.1		
IR	240.2(2)	24	23			1.0	0.6		
	239.2(2)	16	21			0.7	0.8		
	231.7(2)	13	24			1.2	0.6		
	229.7(2)	11	14			0.8	0.5		
Vermillion	236.5(2)	14	16			0.9	0.9		
IR	209.4(2)	20	18			1.2	0.9		
	184.8(2)	34	22			1.9	0.2		
	173.4(2)	17	14			2.4	0.4		
	166.1(2)	8.9	21			0.7	0.7		
Kickapoo	160.8(2)	14	18			0.3	1.0		
IR	158.5(2)	10	18			1.2	0.6		
	156.5(2)	12	14			1.2	1.4		
Mackinaw	159.7(2)	39	18			1.3	0.4		
IR	143.2(2)	15	19			1.2	2.0		
	125.8(2)	23	18			2.5	1.6		
Spoon	129.2(2)	41	17			3.7	0.0		
IR	105.5(2)	29	15			2.1	1.4		
Sangamon	102.4(2)	31	101			2.4	1.0		
IR	88 (2)	21	21			2.5	0.3		

TABLE V-4c
RADIOACTIVITY LEVELS
ILLINOIS RIVER SYSTEM
July-September, 1962

STATION	BETA ACTIVITY uuc/liter S.S.	D.S.	uuc/gram BOTTOM MUD	ALGAE	ALPHA ACTIVITY uuc/liter S.S.	D.S.	uuc/gram BOTTOM MUD	ALGAE
Lamoine (2)	25	17						
IR 81 (2)	22	22			0.8	0.1		
78.6 (2)	19	21			2.3	0.0		
71.2 (2)	19	15			3.4	0.2		
55.9 (2)	26	16			2.2	0.7		
Macoupin (2)	14	21			4.8	0.6		
IR 21.7 (2)	8.2	11			0.7	0.4		
					1.6	1.8		

a. Cladophora
b. Vaucheria
c. Ulothrix
d. Spriogyra
e. Oscillatoria
f. Oedogonium
g. Lyngbya
h. Phormielium
i. Microspora
j. Stigeoclonium
k. Fragilaria

NS North Shore Channel
NB North Branch, Chicago R.
CH Chicago Harbor
SB South Branch, Chicago R.
SS Sanitary & Ship Canal
CA Calumet R.
GC Grand Calumet R.
IH Indiana Harbor
LC Little Calumet R.
TC Thorn Creek
HD Hart Ditch
CS Calumet Sag Channel
DP Des Plaines R.
IR Illinois R.

(1) Less than 0.05.
(2) Average results from 2 sampling dates.
(3) Average results from 13 sampling dates.

TABLE V-5
ARGONNE NATIONAL LABORATORY LIQUID WASTES
TOTAL ANNUAL DISCHARGE[3,4]

Year	Alpha (mc)	Strontium-90 (mc)	Beta Emitters (Excluding Strontium-90) (mc)
1959	22	2.0	159
1960	22	1.4	140
1961	9.5	2.2	135
1962*	2.8	.5	32

*January 1 to April 1 only.

TABLE V-6
TOTAL ALPHA ACTIVITY AND URANIUM ACTIVITY
IN SAWMILL CREEK WATER
1959 to 1962 [3,4]

		Total Alpha Activity			Uranium		
			uuc/l			uuc/l	
Year	Location[1]	No. of Samples	Max.	Avg.	No. of Samples	Max.	Avg.
1959	A	29	4.6	2.8	30	3.8	1.8
	B	149	265	22.8	77	285	34.5
1960	A	46	6.1	1.9	45	4.5	1.2
	B	146	850	30	78	860	46
1961	A	52	5.5	1.9	25	2.0	1.2
	B	153	64.1	6.8	153	52.1	5.6
1962[2]	A	20	2.5	1.8	9	1.5	1.1
	B	72	11.5	4.8	72	7.6	3.3

[1]Location A, Upstream from waste water outfall at Argonne
Location B, Downstream from waste water outfall at Argonne

[2]January - June 1962

[3]Sedlet, Jr. Environmental Radioactivity at Argonne National Laboratory, Report for the Year 1959, ANL-6282 (January 1961).

[4]Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, Summary Report for the Year 1960. Mimeo., Unpublished. (1961); Annual Summary, 1961, Mimeo., Unpublished. (1962); and Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished. (1962)

TABLE V-7
PLUTONIUM AND THORIUM ACTIVITY
IN SAWMILL CREEK WATER
1959 to 1962 [3,4]

Year	Location[1]	PLUTONIUM No. of Samples	PLUTONIUM uuc/l Max.	PLUTONIUM uuc/l Avg.	THORIUM No. of Samples	THORIUM uuc/l Max.	THORIUM uuc/l Avg.
1959	A	17	--	--	17	0.2	0.05
	B	36	1.2	0.23	36	2.0	0.09
1960	A	19	*	*	19	0.23	0.06
	B	46	1.1	0.2	46	0.90	0.18
1961	A	12	*	*	12	0.08	0.03
	B	153	0.7	0.08	153	0.58	0.05
1962[2]	A	5	*	*	5	*	*
	B	72	0.18	0.05	72	0.37	0.06

* Less than 0.05 uuc/l

1 Location A, Upstream from Waste Water Outfall at Argonne
" B, Downstream " " " " " "

2 January - June 1962

3 Sedlet, Jr., Environmental Radioactivity at Argonne National Laboratory, Report for the Year 1959, ANL-6282 (January 1961).

4 Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, Summary Report for the Year 1960; Mimeo., Unpublished. (1961); Annual Summary, 1961, Mimeo., Unpublished. (1962); and Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished. (1962)

TABLE V-8
TOTAL BETA ACTIVITY IN SAWMILL CREEK
1959 to 1962 [3,4]

Year	Location[1]	TOTAL BETA ACTIVITY No. of Samples	uuc/l Max.	uuc/l Avg.
1959	A	29	150	33
	B	149	859	49
1960	A	46	15	5.7
	B	146	472	38
1961	A	52	34	10
	B	153	127	30
1962[2]	A	20	142	36
	B	72	77	45

1 Location A, Upstream from Waste Water Outfall at Argonne
" B, Downstream " " " " " "

2 January - June 1962

3 Sedlet, Jr., Environmental Radioactivity at Argonne National Laboratory, Report for the Year 1959, ANL-6282 (January 1961).

4 Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, Summary Report for the Year 1960; Mimeo., Unpublished. (1961); Annual Summary, 1961, Mimeo., Unpublished. (1962); and Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished. (1962)

TABLE V-9
BETA-EMITTING NUCLIDES IN SAWMILL CREEK WATER(4)
JANUARY - JUNE 1962

Nuclide	Location(1)	No. of Samples	Concentration uuc/l Av.(3)	Min.	Max.	% MPC Av.	Max.
Thorium-234 and Protactinium-234	13L	9	0.9	0.6	1.2	0.005	0.006
	7M	72	2.6	1.0	6.1	0.01	0.03
Cobalt-58	13L	20	(2)	(2)	(2)	-	-
	7M	72	36	(2)	290	0.04	0.3
Cobalt-60	13L	20	(2)	(2)	(2)	-	-
	7M	72	1.8	(2)	12	0.004	0.02
Strontium-90	13L	20	1.5	0.6	2.4	1.5	2.4
	7M	72	1.6	1.0	3.1	1.6	3.1
Cesium-137	13L	4	0.7	(2)	1.4	0.004	0.007
	7M	72	3.8	(2)	10.3	0.02	0.05
Iodine-131	13L	19	(2)	(2)	(2)	-	-
	7M	72	1.1	(2)	11	0.06	0.06
Strontium-89	13L	20	17	7.0	40	0.17	0.4
	7M	72	13	1.0	25	0.13	0.25
Barium-140	13L	20	0.5	(2)	0.6	0.002	0.002
	7M	23	0.5	(2)	1.8	0.002	0.006

(1) Location 13L is upstream from the Argonne site.
Location 7M is downstream from the waste water outfall.

(2) Less than the minimum amounts detectable by the analytical methods used. The minimum detectable amounts are 0.5 uuc/l for strontium-90 and cesium-137, 5 uuc/l for cobalt-58, 3 uuc/l for cobalt-60, iodine-131 and barium-140.

(3) The average concentrations were calculated assuming a concentration of one-half of the minimum detectable amount for those samples in which a given nuclide was not found.

(4) Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished (1962).

TABLE V-10
TOTAL ALPHA AND BETA ACTIVITIES
IN DES PLAINES RIVER
ABOVE AND BELOW SAWMILL CREEK
1959-1962[3,4]
(Micromicrocuries per Liter)

Year	Location[1]	No. of Samples	ALPHA		BETA		URANIUM	
			Max.	Avg.	Max.	Avg.	Max.	Avg.
1959	A	11	3.8	2.6	168	76	1.9	1.5
	B	14	4.5	2.2	158	66	2.7	1.5
1960	A	34	4.2	2.4	15.9	8.4	1.9	1.5
	B	37	3.5	2.2	12.7	8.4	2.2	1.5
1961	A	45	5.1	2.6	66.0	17.2	2.2	1.6
	B	47	5.5	2.4	56.1	16.9	3.8	1.6
1962[2]	A	15	4.3	2.2	122	64	*	*
	B	15	2.3	2.4	98	54	*	*

1 Location A, Near Rt. 45, upstream from mouth of Sawmill Creek.
Location B, Near Lemont, downstream from mouth of Sawmill Creek.

2 January - June 1962

3 Sedlet, Jr., Environmental Radioactivity at Argonne National Laboratory, Report for the Year 1959, ANL-6282 (January 1961).

4 Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, Summary Report for the Year 1960; Mimeo., Unpublished. (1961); Annual Summary, 1961, Mimeo., Unpublished. (1962); and Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished. (1962)

*See Table V-11

TABLE V-11
RADIOACTIVITY IN DES PLAINES RIVER WATER
JANUARY - JUNE 1962
(Micromicrocuries per Liter)

Nuclide or Element	Location[1]	No. of Samples	Concentration Av.[3]	Min.	Max.
Uranium	A	7	1.5	1.1	2.1
	B	14	1.2	1.0	1.4
Plutonium	A	3	(2)	(2)	(2)
	B	3	(2)	(2)	(2)
Thorium-232	A	3	(2)	(2)	(2)
	B	3	0.05	(2)	0.09
Thorium-234 Protactinium-234	A	7	1.2	0.8	2.3
	B	14	1.0	0.7	1.4
Strontium-90	A	3	2.4	1.8	3.3
	B	3	2.1	1.4	2.6
Strontium-89	A	3	18	13	22
	B	3	17	16	18
Cesium-137	A	4	0.9	(2)	1.6
	B	4	1.1	(2)	2.7
Barium-140 and Iodine-131	A	3	(2)	(2)	(2)
	B	3	(2)	(2)	(2)
Cobalt-58 and Cobalt-60	A	14	(2)	(2)	(2)
	B	14	(2)	(2)	(2)

(1) Locations are the same as given in the previous table.

(2) Less than the minimum amount detectable by the analytical method used. The minimum detectable amounts are 0.5 uuc/l for strontium-90 and cesium-137, 0.05 uuc/l for plutonium and thorium, 5 uuc/l for cobalt-58 and iodine-131, 3 uuc/l for cobalt-60, strontium-89 and barium-140.

(3) The average concentrations were calculated assuming a concentration of one-half of the minimum detectable amount for those samples in which a given nuclide was not detectable.

Data from
Argonne National Laboratory, Environmental Radioactivity at Argonne National Laboratory, January 1962-June 1962, Mimeo., Unpublished (1962).

TABLE V-12

Permissible Activity Discharge Concentrations
From Dresden Nuclear Power Station
To Illinois River

Month	Gross Beta Activity (uuc/l)	
	Average at Morris, Ill. for 12 Months Preceding Month Shown	Maximum Allowable Concentration for Dresden Discharge for Month Shown
December 1959	32.1	67.9
January 1960	31.4	68.6
February	31.0	69.0
March	32.7	67.3
April (Operation Tests begin)	25.8	74.2
May	18.6	81.4
June	16.4	83.6
July	11.9	88.1
August	8.2	91.8
September	8.3	91.7
October (Authorized Full Power Operation)	7.0	93.0
November (Shut down)	6.6	93.4
December	6.3	93.7
January 1961	5.1	94.9
February	5.8	94.2
March	5.6	94.4
April (Station on line at 100 KW)	5.2	94.8
May	6.6	93.4
June	7.1	92.9
July	7.5	92.5
August	7.7	92.3
September	7.7	92.3
October	7.7	92.3
November	8.4	91.6
December	8.4	91.6
January 1962	8.8	91.2
February	9.1	90.9
March	10.3	89.7
April	13.3	86.7
May	17.6	82.4
June	18.9	81.1
July	22.1	77.9

TABLE V-13
UNSEALED ISOTOPE USE
CHICAGO, ILLINOIS

TYPE AND NUMBER OF USERS		AMT. OF ACTIVITY ON HAND (CURIES)	EST. ANNUAL USE (CURIES)	ISOTOPES USED
Industry	20	35.9	55.1	H-3; C-14; Na-22, 24; P-32; S-35; Cl-36; K-42; Ca-45; Cr-51; Fe-55, 59; Co-60; Ni-63; Zn-65; Sr-85, 90; Zr-95; Ag-110, 111; I-125, 131; Cs-137; Pm-147; Au-198; Tl-204; Bi-206, 210; Pb-210; Ra-226; Th-232; U-238
Medical	29	26.2	40.2	
Educational	5	12.4	14.2	
Total	54	74.5	109.5	32

TABLE V-14
RADIOACTIVITY IN
CHICAGO WATER SUPPLY
AND SEWAGE EFFLUENTS

Sample Source	Date of Sample	Total Dissolved Solids(mg/l)	Alpha uuc/l			Beta uuc/l		
			Diss.	Susp.	Total	Diss.	Susp.	Total
Calumet STW								
Tap Water	5-15-61	98	0.6	0.1	0.7	7.4	0.6	8
Calumet STW								
Effluent	5-15-61	748	0.4	0.2	0.6	30.	2.0	32
Effluent	6-5-61	726	1.4	0.1	1.5	16.	0.6	17
Raw	2-15-62	912	1.4	1.5	2.9	12.	6.4	18
Effluent	2-15-62	935	0.9	1.3	2.2	17.	4.2	21
Northside STW								
Effluent	5-15-61	438	0.6	0.2	0.8	14.	1.7	16
Effluent	6-5-61	461	0.9	0.1	1.0	19.	0.6	20
Raw	2-15-62	564	0.2	0.7	0.9	14.	7.4	21
Effluent	2-15-62	481	0.3	0.7	1.0	20.	5.0	25
WSW-STW								
Effluent	6-5-61	551	1.1	0.4	1.5	14.	3.7	18
Raw	2-15-62	634	1.1	1.1	2.2	14.	2.8	17
Raw(W)	2-15-62	836	0.4	1.4	1.8	13.	16.	29
Effluent	2-15-62	738	0.7	1.1	1.8	18.	4.0	22

TABLE VI-1

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

July - August, 1961

Station	Mean Number of Individuals per Square Foot of Bottom								
	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
North Shore Channel:									
NS 340.7	272	11	7		4				293
NS 336.9	5,023	12							5,035
NS 334.9	27,599	1					5		27,605
Chicago River:									
NB 325.8	1,325								1,325
CH 326.9	647	52			67	23	23		812
SB 324.3	38,066				171				38,237
Sanitary and Ship Canal:									
SS 317.3	819								819
SS 314.0	9,253								9,253
SS 307.9	8								8
SS 300.5	14								14
SS 292.0	0								0
Calumet-Sag Channel and Tributaries:									
CA 333.0	3								3
CA 328.1	4,683								4,683
GC 325.8	0								0
LC 322.4	6,067				851				6,918
LC 319.7	14,320								14,320
CS 314.9	9,283								9,283
CS 308.4	2,601								2,601
Des Plaines River:									
DP 293.0	380	9	59			1			449
DP 286.5	80								80

TABLE VI-1 (continued)

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

July - August, 1961

Station	Mean Number of Individuals per Square Foot of Bottom								
	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
Kankakee River:									
KR 280.0		1	1		14	1		(a)	30
Illinois River:									
IR 271.5	5,104				7				5,111
IR 263.0	13	1	1						15
Marseilles Pool:									
IR 245.8	17								17
Starved Rock Pool:									
IR 232.0	28		9						37
Peoria Pool:									
IR 194.1	3								3
IR 178.0	131		4						135
IR 170.9	33	36							69
IR 166.2	128		8			29			165

(a) Caddisfly Larvae - 10
Mayfly Nymphs - 1
Crayfish - 1
Unionid Clam - 1

TABLE VI-2

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

October - November, 1961

Mean Number of Individuals per Square Foot of Bottom

Station	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
North Shore Channel:									
NS 340.7	695	1	4						700
NS 336.9	127,526	42							127,568
NS 334.9	94,687	12					292		94,991
Chicago River:									
NB 325.8	1,744						31		1,775
CH 326.9	3,551	192			249	29	12		4,033
SB 324.3	37,041				3				37,044
Sanitary and Ship Canal:									
SS 317.3	46					1			47
SS 314.0	13,787								13,787
SS 307.9	287								287
SS 300.5	0								0
SS 292.0	147								147
Calumet-Sag Channel and Tributaries:									
CA 333.0	89								89
CA 328.1	3,160								3,160
GC 325.8	0								0
LC 322.4	18,570				44			(a)	18,615
LC 317.7	11,066								11,066
CS 314.9	3,745								3,745
CS 308.4	5,268								5,268

(a) Unidentified Diptera larvae 1

TABLE VI-2 (Continued)

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

October - November, 1961

Station	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
	Mean Number of Individuals per Square Foot of Bottom								
Des Plaines River:									
DP 293.0	28	3							31
DP 286.5	13,609								13,609
Kankakee River:									
KR 280.0		8	3		1	4		(b)	18
Illinois River:									
IR 271.5	3,960								3,960
IR 263.0	51		1						52
Marseilles Pool:									
IR 245.8	112								112
Starved Rock Pool:									
IR 232.0	401								401
Peoria Pool:									
IR 194.1	11								11
IR 178.0	284		1						285
IR 170.9	196		21						217
IR 166.2	90		2						92

(b) Mayfly nymphs 2

TABLE VI-3

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

February, 1962

Station	Mean Number of Individuals per Square Foot of Bottom								
	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
North Shore Channel:									
NS 334.9	176,000	24				28			176,052
Chicago River:									
NB 325.8	1,627								1,627
CH 326.9	3,233	64			52	248			3,597
SB 324.3	13,554								13,554
Sanitary and Ship Canal:									
SS 317.3	55								55
SS 314.0	6,253								6,253
SS 307.9	144								144
SS 300.5	871								871
SS 292.0	18,675								18,675
Calumet-Sag Channel and Tributaries:									
CA 333.0	1,741	1			17				1,759
CA 328.1	11,257	4			23				11,284
GC 325.8									0
LC 322.4	17,992	1							17,993
LC 319.7	427		1						428
CS 314.9	5,575								5,575
CS 308.4	3,497		1						3,498

TABLE VI-3 (continued)

BOTTOM FAUNA POPULATIONS IN THE ILLINOIS RIVER SYSTEM

February, 1962

Mean Number of Individuals per Square Foot of Bottom

Station	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total per Sq. Ft.
Des Plaines River:									
DP 286.5	15,991								15,991
Illinois River:									
IR 271.5	37,787	1							
IR 263.0	107	1	1				1		37,787 109
Marseilles Pool:									
IR 245.8	6	3							9
Starved Rock Pool:									
IR 232.0	9								9
Peoria Pool:									
IR 194.1	39		1						40

TABLE VI-3a

BOTTOM FAUNA POPULATIONS IN THE CALUMET AREA
February-March, 1962

Station	Mean Number of Individuals Per Square Foot of Bottom								
	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total Per Sq. Ft.
Grand Calumet River:									
GC 344.8									0
GC 336.0									0
GC 332.2	1								1
GC 331.1	59								59
GC 325.8									0
Indiana Harbor Canal:									
IH 331.9	45								45
Calumet River:									
CA 327.0	744								744
Little Calumet River:									
LC 351.1	1808	3	71						1900
LC 337.2	918	2	36				12	(a)	976
LC 334.9	7833		76				14	(b)	7909
LC 328.0	200								200
LC 319.7	423								424
LC 320.1	6892		1						6892
Thorn Creek:									
TH 330.3									0

(a) Unidentified insect larvae	1
Dobson Fly larvae (Helgrammite)	1
Unidentified Diptera larvae	4
(b) Crayfish	6

TABLE VI-3b

BOTTOM FAUNA IN THE LOWER ILLINOIS RIVER
July-November, 1961

Station	Mean Number of Individuals per Sq. Ft. of Bottom								
	Sludgeworms	Leeches	Bloodworms	Scuds	Clams	Operc. Snails	Pulm. Snails	Other	Total Per Sq. Ft.
Peoria Pool:									
IR 163.5	72		92						164
IR 159.4	152								152
La Grange Pool:									
IR 113.8			24			8		a	36
Alton Pool:									
IR 24.5	194		3						197
IR 21	169	13	8		80				270

a. Unionid Clams 4

TABLE VI-4

ATTACHED FILAMENTOUS ALGAE IN THE ILLINOIS RIVER SYSTEM

Station	July-August, 1961		October-November, 1961		February, 1962	
	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution
North Shore Channel:						
NS 340.7	Cladophora glomerata	moderate	Rhizoclonium sp.	intolerant	no sample	
NS 336.9	Vaucheria sp.	intolerant	Cladophora sp.	moderate	no sample	
NS 334.9	Ulothrix zonata	tolerant	Cladophora sp.	moderate	Stigeoclonium stagnatile	tolerant
					Gladophora glomerata	moderate
Chicago River:						
NB 325.8	Microspora floccosa	unknown	Lyngbya sp.	tolerant	Arthrospira sp.	tolerant
					Lyngbya birgei	tolerant
CH 326.99	Cladophora glomerata	moderate	Oscillatoria sp.	tolerant	no algae	
SB 324.3	Phormidium incrustatum	tolerant	Lyngbya sp.	tolerant	Lyngbya sp.	tolerant
					Oscillatoria sp.	tolerant
Sanitary and Ship Canal:						
SS 317.3	Ulothrix zonata	tolerant	no algae			
SS.314.0	Ulothrix zonata	tolerant	no algae		no algae	
					Oscillatoria sp.	tolerant
					Tolypothrix tenuis	unknown

TABLE VI-4 (CONTINUED)

ATTACHED FILAMENTOUS ALGAE IN THE ILLINOIS RIVER SYSTEM

Station	July-August, 1961		October-November, 1961		February, 1962	
	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution
SS 307.9	Ulothrix zonata	tolerant	Oscillatoria sp.	tolerant	no algae	
SS 300.5	Ulothrix zonata	tolerant	Spirogyra sp.	tolerant	Lyngbya sp.	tolerant
SS 292.0	Oscillatoria tenuis	tolerant	Ulothrix zonata	tolerant	no algae	
Calumet Sag Canal and Tributaries:						
CA 333.0	Cladophora glomerata	moderate	Cladophora sp.	moderate	no algae	
CA 328.1	Oscillatoria tenuis	tolerant	Oscillatoria sp.	tolerant	Lyngbya sp.	tolerant
GC 325.8	Oscillatoria tenuis	tolerant	Lyngbya sp.	tolerant	no algae	
LC 322.4	Oscillatoria tenuis	tolerant	Ulothrix zonata	tolerant	no algae	
LC 319.7	Spirogyra sp.	tolerant	Lyngbya sp.	tolerant	no algae	
CS 314.9	Ulothrix zonata	tolerant	Oscillatoria sp.	tolerant	no algae	
CS 308.4	Ulothrix zonata	tolerant	no algae		Stigeoclonium tenue	tolerant

TABLE VI-4 (continued)

ATTACHED FILAMENTOUS ALGAE IN THE ILLINOIS RIVER SYSTEM

Station	July-August 1961		October-November 1961		February 1962	
	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution
Des Plaines River:						
DP 293.0	no algae		no algae		no sample	
DP 286.5	Ulothrix zonata	tolerant	no sample		Cladophora glomerata	moderate
Kankakee River:						
KR 280.0	Cladophora glomerata	moderate	Cladophora sp.		no sample	
Illinois River:						
IR 271.5	Ulothrix zonata	tolerant	Ulothrix zonata	tolerant	no algae	
IR 263.0	Spirogyra varians	tolerant	Stigeoclonium sp.	tolerant		
			Navicula sp.	tolerant	no algae	
Marseilles Pool:						
IR 245.8	Spirogyra sp.	tolerant	Ulothrix zonata	tolerant	no algae	
			Nitzschia sp.	tolerant		
Starved Rock Pool:						
IR 232.0	Cladophora glomerata	moderate	Cladophora sp.	moderate	no algae	

TABLE VI-4 (continued)

ATTACHED FILAMENTCUS ALGAE IN THE ILLINOIS RIVER SYSTEM

Station	July-August 1961		October-November 1961		February 1962	
	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution	Predominant Genera	Tolerance to Pollution
Peoria Pool:						
IR 194.1	Oscillatoria limnetica	tolerant	no algae		no algae	
IR 178.0	Spirogyra sp.	tolerant	Cladophora sp.	moderate	no sample	
IR 170.9	Cladophora glomerata	moderate	Cladophora sp.	moderate	no sample	
IR 166.2	Cladophora glomerata	moderate	Cladophora sp.	moderate		

TABLE VI-5 (continued)

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE

KEY TO ABUNDANT GENERA:

Diatoms

a. Asterionella
b. Cyclotella
c. Fragilaria
d. Gomphonema
e. Melosira
f. Navicula
g. Nitzschia
h. Rhizosolenia
i. Stephanodiscus
j. Synedra
k. Tabellaria
l. Genus Unidentified

Greens

m. Ankistrodesmus
n. Chlorella
o. Micractinium
p. Scenedesmus
q. Genus Unidentified

Blue-Greens

r. Anacystis
s. Oscillatoria
t. Genus Unidentified

Flagellates

u. Dinobryon
v. Euglena
w. Genus Unidentified

TABLE VI-5 (continued)

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE
Seasonal Averages - July 1961-June 1962

Stream Station	Kind of Algae	Microorganisms per Milliliter Summer 1961	Fall 1961	Winter 1962	Spring 1962
IR 165.3	Blue-Greens	-	-	25	-
	Greens	-	-	43	-
	Flagellates	-	-	46	-
	Diatoms	-	-	757	-
	Total	-	-	871	-
	Abundant Genera	-	-	bdf	-
IR 162.2	Blue-Greens	-	-	191	99
	Greens	-	-	29	337
	Flagellates	-	-	4	143
	Diatoms	-	-	1276	7190
	Total	-	-	1500	7769
	Abundant Genera	-	-	begr	beij
IR 158.8	Blue-Greens	2339	-	-	-
	Greens	2647	-	-	-
	Flagellates	748	-	-	-
	Diatoms	11161	-	-	-
	Total	16895	-	-	-
	Abundant Genera	b	-	-	-
IR 156.5	Blue-Greens	-	195	16	-
	Greens	-	173	65	-
	Flagellates	-	36	7	-
	Diatoms	-	7947	695	-
	Total	-	8351	783	-
	Abundant Genera	-	b	b	-
IR 152.9	Blue-Greens	6300	38	4	165
	Greens	5050	160	37	495
	Flagellates	650	36	6	238
	Diatoms	18550	7914	1284	7671
	Total	30550	8148	1331	8570
	Abundant Genera	b	b	bedfgr	abejlv
IR 139.0	Blue-Greens	2438	68	-	-
	Greens	2738	185	-	-
	Flagellates	450	48	-	-
	Diatoms	14250	7380	-	-
	Total	19876	7681	-	-
	Abundant Genera	b	b	-	-
IR 122.2	Blue-Greens	2475	-	-	-
	Greens	2827	-	-	-
	Flagellates	418	-	-	-
	Diatoms	12122	-	-	-
	Total	17842	-	-	-
	Abundant Genera	b	-	-	-

TABLE VI-5 (continued)

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE
Seasonal Averages - July 1961-June 1962

Microorganisms per Milliliter

Stream Station	Kind of Algae	Summer 1961	Fall 1961	Winter 1962	Spring 1962
IR 196.0	Blue-Greens	-	-	9	638
	Greens	-	-	9	1587
	Flagellates	-	-	0	743
	Diatoms	-	-	1229	6490
	Total	-	-	1247	9458
	Abundant Genera	-	-	abdfg	bepv
IR 195.0	Blue-Greens	770	-	-	-
	Greens	1078	-	-	-
	Flagellates	266	-	-	-
	Diatoms	4704	-	-	-
	Total	6818	-	-	-
	Abundant Genera	b	-	-	-
IR 189.2	Blue-Greens	-	-	94	330
	Greens	-	-	14	1149
	Flagellates	-	-	20	539
	Diatoms	-	-	1163	4917
	Total	-	-	1291	6935
	Abundant Genera	-	-	bdgr	bjmp
IR 181.3	Blue-Greens	-	58	18	-
	Greens	-	113	33	-
	Flagellates	-	0	18	-
	Diatoms	-	6222	855	-
	Total	-	6393	924	-
	Abundant Genera	-	b	bdf	-
IR 178.0	Blue-Greens	1533	-	-	-
	Greens	1367	-	-	-
	Flagellates	550	-	-	-
	Diatoms	9992	-	-	-
	Total	13442	-	-	-
	Abundant Genera	b	-	-	-
IR 173.4	Blue-Greens	-	-	11	-
	Greens	-	-	18	-
	Flagellates	-	-	0	-
	Diatoms	-	-	499	-
	Total	-	-	528	-
	Abundant Genera	-	-	dg	-
IR 170.9	Blue-Greens	3205	74	-	-
	Greens	2640	106	-	-
	Flagellates	1166	16	-	-
	Diatoms	10729	7848	-	-
	Total	17740	8044	-	-
	Abundant Genera	b	b	-	-
IR 166.6	Blue-Greens	5861	184	-	-
	Greens	4797	152	-	-
	Flagellates	1811	42	-	-
	Diatoms	8885	8357	-	-
	Total	21354	8735	-	-
	Abundant Genera	b	b	-	-

TABLE VI-5 (continued)

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE
Seasonal Averages - July 1961-June 1962

Microorganisms per Milliliter

Stream Station	Kind of Algae	Summer 1961	Fall 1961	Winter 1962	Spring 1962
	Blue-Greens	-	36	60	967
IR 252.7	Greens	-	27	6	1493
	Flagellates	-	0	11	183
	Diatoms	-	744	611	1972
	Total	-	807	688	4615
	Abundant Genera	-	bf	bdfgs	blprv
	Blue-Greens	1452	36	-	-
IR 248.0	Greens	1773	27	-	-
	Flagellates	373	0	-	-
	Diatoms	6118	744	-	-
	Total	9716	807	-	-
	Abundant Genera	b	b	-	-
Fox River	Blue-Greens	3450	159	51	1936
FR 241.5	Greens	7475	202	92	5537
	Flagellates	550	14	14	164
	Diatoms	23100	10570	5671	21560
	Total	34575	10945	5828	29197
	Abundant Genera	bepr	bei	bdefgr	befjmpqr
Illinois	Blue-Greens	-	44	140	542
River	Greens	-	89	9	1572
IR 239.7	Flagellates	-	5	0	546
	Diatoms	-	1375	1268	1695
	Total	-	1513	1417	4355
	Abundant Genera	-	bf	bdfgr	bmnprv
	Blue-Greens	823	34	69	55
IR 231.7	Greens	1700	66	19	99
	Flagellates	238	0	19	638
	Diatoms	6225	4326	1430	4972
	Total	8986	4426	1537	5764
	Abundant Genera	b	b	bd	bv
	Blue-Greens	-	-	118	-
IR 229.7	Greens	-	-	25	-
	Flagellates	-	-	14	-
	Diatoms	-	-	1478	-
	Total	-	-	1635	-
	Abundant Genera	-	-	bdg	-
Vermillion	Blue-Greens	4319	2	39	227
River	Greens	2528	11	0	601
VR 231.4	Flagellates	777	2	0	59
	Diatoms	15669	737	355	8412
	Total	23293	752	394	9299
	Abundant Genera	ber	dfj	dfgjl	bdefjlm
Illinois	Blue-Greens	-	-	40	754
River	Greens	-	-	11	2354
IR 218.4	Flagellates	-	-	0	242
	Diatoms	-	-	1032	3151
	Total	-	-	1083	6501
	Abundant Genera	-	-	bcdfg	bmpr

TABLE VI-5 (continued)

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE
Seasonal Averages -- July 1961-June 1962

Stream Station	Kind of Algae	Microorganisms per Milliliter Summer 1961	Fall 1961	Winter 1962	Spring 1962
	Blue-Greens	1840	-	551	2106
CS 304.1	Greens	1593	-	30	2076
	Flagellates	203	-	17	166
	Diatoms	919	-	180	659
	Total	4555	-	778	5007
	Abundant Genera	bmprv	-	bgrs	mprsv
	Blue-Greens	208	225	-	-
GC 325.8	Greens	150	425	-	-
	Flagellates	71	50	-	-
	Diatoms	384	75	-	-
	Total	813	775	-	-
	Abundant Genera	bjkorv	o	-	-
Sanitary and	Blue-Greens	-	-	251	198
Ship Canal	Greens	-	-	15	1294
SS 296.2	Flagellates	-	-	22	44
	Diatoms	-	-	331	1166
	Total	-	-	619	2702
	Abundant Genera	-	-	brs	beimopv
Des Plaines	Blue-Greens	800	225	197	400
River	Greens	675	1800	0	1303
DR 286.5	Flagellates	79	125	23	139
	Diatoms	1071	775	477	2610
	Total	2625	2925	697	4452
	Abundant Genera	befopr	p	abdrs	bgmpv
Kankakee	Blue-Greens	-	33	15	83
River	Greens	-	5	22	255
KR 277.5	Flagellates	-	3	0	0
	Diatoms	-	484	338	2599
	Total	-	525	375	2942
	Abundant Genera	-	fj	bdfglr	bfjp
Illinois	Blue-Greens	876	152	131	238
River	Greens	1566	708	11	748
IR 271.5	Flagellates	158	10	14	15
	Diatoms	1914	1194	521	2028
	Total	4514	2064	677	3029
	Abundant Genera	bpr	bp	bdlr	bgjpr
Mazon River	Blue-Greens	-	16	66	22
MR 264.6	Greens	-	28	0	92
	Flagellates	-	18	0	51
	Diatoms	-	841	466	1258
	Total	-	903	532	1423
	Abundant Genera	-	dfgj	bdfjs	bdmv
Illinois	Blue-Greens	792	55	105	25
River	Greens	3124	64	25	75
IR 263.5	Flagellates	110	12	50	375
	Diatoms	6820	908	934	3225
	Total	10846	1039	1114	3700
	Abundant Genera	b	b	bd	b

TABLE VI-5

RECORD OF BIOLOGICAL ANALYSIS
PLANKTON ALGAE
Seasonal Averages - July 1961-June 1962

		Microorganisms per Milliliter			
		Summer	Fall	Winter	Spring
Stream Station	Kind of Algae	1961	1961	1962	1962
North Shore	Blue-Greens	266	644	42	53
NS 340.7	Greens	72	140	26	152
	Flagellates	93	84	12	37
	Diatoms	2152	2212	4680	4471
	Total	2583	3080	4760	4713
	Abundant Genera	bfjkr	k	abgjkr	abhjk
Chicago River	Blue-Greens	-	-	157	289
NB 325.8	Greens	-	-	7	485
	Flagellates	-	-	3	143
	Diatoms	-	-	639	2451
	Total	-	-	806	3368
	Abundant Genera	-	-	bjrst	abgjrp
	Blue-Greens	150	176	217	48
CH 326.9	Greens	33	528	30	70
	Flagellates	33	66	22	42
	Diatoms	506	2826	2083	2586
	Total	722	3096	2352	2746
	Abundant Genera	bcks	b	bejkrs	abchj
	Blue-Greens	88	275	-	-
SB 322.9	Greens	54	425	-	-
	Flagellates	58	25	-	-
	Diatoms	367	650	-	-
	Total	567	1375	-	-
	Abundant Genera	bks	p	-	-
Sanitary and	Blue-Greens	-	-	235	93
Ship Canal	Greens	-	-	9	232
SS 317.3	Flagellates	-	-	28	104
	Diatoms	-	-	917	2884
	Total	-	-	1189	3313
	Abundant Genera	-	-	abksr	bghijpqr
	Blue-Greens	-	-	192	99
SS 307.9	Greens	-	-	23	207
	Flagellates	-	-	25	23
	Diatoms	-	-	448	1325
	Total	-	-	688	1659
	Abundant Genera	-	-	bkrs	bgijkmp
Calumet-Sag	Blue-Greens	133	308	452	41
Channel and	Greens	19	112	4	57
Tributaries	Flagellates	29	28	5	57
CA 333.0	Diatoms	588	420	509	1035
	Total	769	868	970	1190
	Abundant Genera	bfjkr	s	bjrstv	bghijku
	Blue-Greens	-	-	159	7
CS 314.9	Greens	-	-	7	149
	Flagellates	-	-	59	252
	Diatoms	-	-	340	519
	Total	-	-	565	927
	Abundant Genera	-	-	bdgrsv	bgmnv

TABLE VII-1-a

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample Points North Shore Channel				
	NS340.7	NS338.6	NS336.9*	NS334.9**	NS333.4
1961 Coliform Densities, Summer Conditions					
April-May	150	4,100	17,000	160,000	130,000
June	160	3,100	6,200	140,000	140,000
July	400	4,600	7,600	150,000	170,000
August	600	1,300	1,600	280,000	110,000
Summer Summary 4-month Geometric Means	230	3,500	8,200	160,000	140,000
No. of samples	71	71	69	71	73
1962 Coliform Densities, Winter Conditions					
January	52	1,800		100,000	140,000
No. of samples	19	4		21	23
1961 Fecal Streptococci, Summer Conditions					
September	320	30	68	2,200	1,200
No. of samples	5	6	5	6	7
1962 Fecal Streptococci, Winter Conditions					
January	100	120		5,200	5,400
No. of samples	8	3		9	11
Direction of Flow	←				North Branch Chicago River

* Above North Plant Sewage Works

**Below North Plant Sewage Works

TABLE VII-1-b

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample points North Branch Chicago River				Sample points Chicago River	
	NB333.4	NB331.4	NB329.0	NB325.8	CH325.8	CH326.9
1961 Coliform Densities, Summer Conditions						
April-May	33,000	130,000	200,000	250,000	5,300	480
June	100,000	150,000	190,000	440,000	18,000	1,400
July	140,000	170,000	25[illegible],000	570,000	11,000	630
August	72,000	80,000	320,000	480,000	7,100	400
Summer Summary 4-month Geometric means	71,000	160,000	220,000	390,000	9,100	680
No. of samples	70	72	61	73	68	73
1962 Coliform Densities, Winter Conditions						
January	21,000	63,000	44,000	18,000	640	200
No. of samples	4	21	22	22	20	20
1961 Fecal Streptococci, Summer Conditions						
September	830	1,600	3,400	2,200	780	200
No. of samples	7	6	6	7	7	6
1962 Fecal Streptococci, Winter Conditions						
January	5,200	5,100	3,400	1,900	100	120
No. of samples	4	11	11	10	11	9
Direction of Flow	→	→	→	↓ South Branch Chicago River	←	←

TABLE VII-1-c

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample points South Branch Chicago River	
	SB 324.3	SB 322.8
1961 Coliform Densities, Summer Conditions		
April-May	140,000	220,000
June	280,000	410,000
July	320,000	350,000
August	97,000	140,000
Summer Summary 4-month Geometric Means	200,000	280,000
No. of samples	71	71
1962 Coliform Densities, Winter Conditions		
January	14,000	13,000
No. of samples	21	20
1961 Fecal Streptococci, Summer Conditions		
September	720	610
No. of samples	7	7
1962 Fecal Streptococci, Winter Conditions		
January	700	1,700
No. of samples	11	11
Direction of Flow → North Branch	→ South Branch	→ San.& Ship Canal

TABLE VII-1-d

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample points Sanitary and Ship Canal								
	SS320.0	SS317.3*	SS314.0**	SS307.9	SS304.1***	SS300.5	SS296.2	SS292.1	SS291.1
1961 Coliform Densities, Summer Conditions									
April-May	240,000	180,000	250,000	320,000	240,000	150,000	120,000	59,000	59,000
June	350,000	290,000	440,000	470,000	320,000	130,000	86,000	48,000	62,000
July	240,000	140,000	620,000	570,000	320,000	260,000	130,000	52,000	83,000
August	180,000	680,000	950,000	900,000	200,000	200,000	150,000	190,000	140,000
Summer Summary 4-month Geometric Means	260,000	230,000	420,000	460,000	270,000	200,000	110,000	61,000	72,000
No. of samples	71	68	64	65	68	72	71	70	72
1962 Coliform Densities, Winter Conditions									
January	19,000	29,000	130,000	84,000	59,000	41,000	41,000	14,000	20,000
No. of samples	18	19	22	21	22	19	19	19	16

*Above South-Southwest (Stickney) Sewage Works
**Below South-Southwest (Stickney) Sewage Works
***Calumet-Sag Channel enters Sanitary and Ship Canal below SS304.1

Part 4 continued on next page -

TABLE VII-1-e

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample points Sanitary and Ship Canal								
	SS320.0	SS317.3	SS314.0	SS307.9	SS304.1	SS300.5	SS296.2	SS292.1	SS291.1
1961 Fecal Streptococci, Summer Conditions									
September	1,500	1,100	2,400	8,100	1,200	330	570	420	520
No. of samples	7	7	7	7	7	6	5	5	6
1962 Fecal Streptococci, Winter Conditions									
January	2,300	2,100	5,800	4,400	3,000	2,600	2,000	500	580
No. of samples	10	10	13	14	14	11	11	11	10
Direction of Flow	→	→	→	→	→	→	→	→	→

↑ Calumet-Sag Channel

TABLE VII-1-f

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample Points						
	Calumet River			Grand Calumet River	Little Calumet River		
	CA332.7	CA328.1	CA327.0	GC325.8	LC322.4	LC320.1	LC320.2
1961 Coliform Densities, Summer Conditions							
April-May	2,200	11,000	4,100	1,700,000	45,000	45,000	100,000
June	1,400	5,100	3,900	3,000,000	67,000	61,000	140,000
July	2,700	1,600	4,700	1,600,000	22,000	49,000	150,000
August	2,000	9,000	3,000	810,000	17,000	43,000	630,000
Summer Summary 4-month Geometric Means	2,000	5,400	4,000	2,300,000	40,000	51,000	150,000
No. of samples	69	71	62	68	66	69	70
1962 Coliform Densities, Winter Conditions							
January	270	1,300	990	27,000	5,600	9,400	37,000
No. of samples	13	15	13	13	15	15	13
1961 Fecal Streptococci, Summer Conditions							
September	140	480	120	1,200	360	830	2,500
No. of samples	7	6	7	5	6	7	7
1962 Fecal Streptococci, Winter Conditions							
January	130	4,700	180	9,100	400	1,900	4,500
No. of samples	10	9	6	8	8	8	7
Direction of Flow	→			→			

TABLE VII-1-g

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample Points					
	Calumet Sag Channel					San and Ship Canal
	CS317.9*	CS314.9	CS311.5	CS308.4	CS304.1	SS300.5
1961 Coliform Densities, Summer Conditions						
April-May	80,000	110,000	77,000	66,000	22,000	150,000
June	150,000	380,000	110,000	140,000	19,000	130,000
July	120,000	130,000	150,000	100,000	36,000	260,000
August	220,000	260,000	6,600	110,000	26,000	200,000
Summer Summary 4 month Geometric Means	120,000	190,000	110,000	98,000	23,000	200,000
No. of samples	71	71	69	70	67	72
1962 Coliform Densities, Winter Conditions						
January	90,000	57,000	47,000	23,000	18,000	41,000
No. of samples	16	23	24	23	19	19
1961 Fecal Streptococci, Summer Conditions						
September	2,100	1,300	520	460	260	330
No. of samples	7	7	7	7	6	6
1962 Fecal Streptococci, Winter Conditions						
January	5,000	3,500	2,200	1,500	490	2,600
No. of samples	9	12	13	13	12	11
Direction of Flow	←	←	←	←	←	←

*Below Calumet Sewage Works

TABLE VII-1-h

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Upper Illinois River System
(Chicago Metropolitan Area)

	Sample Points					
	San. and Ship Canal	Des Plaines River			Illinois River	Kankakee River
	SS291.1	DP292.7	DP285.8	DP278.0	IR271.5	KR277.5
1961 Coliform Densities, Summer Conditions						
April-May	59,000	4,800	100,000	30,000	14,000	42,000
June	62,000	6,000	58,000	67,000	18,000	26,000
July	83,000	1,900	90,000	110,000	23,000	7,600
August	140,000	4,000	65,000	200,000	15,000	9,900
Summer Summary 4 month Geometric Means	72,000	4,200	79,000	64,000	17,000	20,000
No. of Samples	72	66	73	71	72	73
1962 Coliform Densities, Winter Conditions						
January	20,000	7,300	32,000	23,000	8,700	5,000
No. of Samples	16	17	12	10	9	10
1961 Fecal Streptococci, Summer Conditions						
September	520	580	910	430	98	290
No. of Samples	6	6	6	6	7	7
1962 Fecal Streptococci, Winter Conditions						
January	580	480	2,500	590	420	560
No. of Samples	10	9	7	5	5	7
Direction of Flow	→	→	→	→	→	←

TABLE VII - 1-i

Summary of Coliform & Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Calumet Drainage Basin

(February-March, 1962)

River Mileage	Coliform /100 ml	Fecal Strep. /100 ml
GC 325.8	63,000	42,000
LC 322.4	8,500	1,200
LC 320.1	49,000	5,500
LC 320.2	75,000	15,000
CS 317.9	130,000	23,000
LC 327.0	5,500	1,100
LC 323.4	120,000	8,600
LC 325.0	120,000	28,000
LC 328.0	190,000	74,000
TC 320.3	240,000	53,000
LC 330.0	120,000	35,000
LC 331.1	130,000	31,000
LC 334.9	120,000	20,000
HD 336.7	130,000	21,000
GC 336.0	24,000	6,600
GC 332.2	38,000	6,000
IH 331.9	43,000	7,500
GC 331.1	160,000	33,000
GC 328.7	160,000	64,000
GC 326.6	300,000	120,000

River Mileage Symbols:

GC - Grand Calumet
LC - Little Calumet
CS - Cal-Sag Channel
TC - Thorn Creek
HD - Hart Ditch
IH - Indiana Harbor Canal

TABLE VII-2a

Lower Illinois River System - Summary of Coliform Results
(Expressed in Geometric Means per 100 ml)

Station Mileage	Location	Study Periods Nov '61	Mar'62	July '62
280.8 T	DuPage R. Tributary	5300	17000	14000
278.7 T	Kankakee R. Tributary	5400	13000	16000
271.6	Dresden Dam	8200	9800	28000
270.6	E.J. & E. RR. Bridge	7300	14000	27000
263.5	Morris Hwy. Bridge	14000	20000	32000
252.7	Seneca Highway Bridge	14000	11000	21000
246.9 (1)	Marseilles-Rapid	5800	NS*	12000
246.9 (2)	Marseilles Canal	1000	NS*	12000
240.2	Sherer Island	6700	7600	8600
241.1 T	Fox R. Tributary	4600	11000	3900
239.2	Hitt Island	8000	6200	14000
231.6	Starved Rock	7500	7400	10000
229.7	Utic Bridge Light	8800	6300	10000
236.5 T	Vermillion R. (Trib.)	17000	7800	6200
209.4	Bureau Creek	7600	3900	11000
184.8	Bennett's Light	4000	1600	8600
173.4	Blue Creek Light	2100	1000	5200
166.1	Peoria Water Intake	1300	780	3500
161.7 T	Kickapoo Ck (Trib.)	9800	9600	23000
158.7	Warning Sign"D&L 1 mi"	4100	3000	25000
156.5	Seven Mile Light	21000	5700	41000
161.0 T	Machinaw R. (Trib.)	12000	7500	6400
143.2	Lancaster Light	38000	17000	210000
125.8	Thompson Light	27000	8500	53000
133.7 T	Spoon R Tributary	19000	6900	8300
105.5	Grand Island Light	29000	7200	27000
105.7 T	Sangamon R. (Trib.)	20000	12000	12000
88.0	Beardstown Bridge	24000	1200	13000
95.8 T	LaMoine R. Tributary	15000	4500	4200
81.0	LaGrange Mark	24000	2000	18000
78.6	Indian Ck. Light	19000	2100	12000
71.2	Meridosia Bridge	N.S.	N.S.	14000
55.9	Flo-Hwy Bridge	N.S.	N.S.	10000
23.7 T	Macpn. Ck Bridge (Trib.)	N.S.	N.S.	6000
21.7	Hardin Hwy. Bridge	N.S.	N.S.	25000

*N.S. - Not Sampled

TABLE VII-2b

Lower Illinois River System - Summary of Fecal Streptococcus Results
(Expressed in Geometric Means per 100 ml)

Station		Study Periods		
Mileage	Location	Nov '61	Mar '62	July '62
280.8 T	DuPage R. (Tributary)	460	15000	1400
278.7 T	Kankakee R. (Trib.)	690	16000	1900
271.6	Dresden Dam	310	6200	810
270.6	E.J.&E. RR. Bridge	270	7000	390
263.5	Morris Highway Bridge	360	5200	630
252.7	Seneca Highway Bridge	390	6200	200
246.9 (1)	Marseilles-Rapids	230	N.S.*	260
246.9 (2)	Marseilles Canal	240	N.S.*	220
240.2	Sherer Island	410	1600	2000
241.1 T	Fox R. (Tributary)	840	6500	2600
239.2	Hitt Island	740	1800	2200
231.6	Starved Rock	1400	7000	450
229.7	Utica Bridge Light	1100	3500	600
236.5 T	Vermillion R. (Trib.)	4100	15000	1500
209.4	Bureau Creek	1200	2400	270
184.8	Bennett's Light	390	1200	120
173.4	Blue Creek Light	240	1000	100
166.1	Peoria Water Intake	210	840	90
161.7 T	Kickapoo Creek (Trib.)	4800	4100	3100
158.7	Warning Sign "D&L 1 mi"	860	2400	3400
156.5	Seven Mile Light	3400	3100	4000
161.0 T	Mackinaw R. (Tributary)	13000	3900	800
143.2	Lancaster Light	8200	6900	1700
125.8	Thompson Light	6200	3600	170
133.7 T	Spoon R. (Tributary)	14000	9700	1100
105.5	Grand Island Light	6100	3000	1800
105.7	Sangamon R. (Tributary)	4100	5000	1400
88.0	Beardstown Bridge	4600	1200	270
95.8 T	LaMoine R. (Tributary)	12000	5900	1100
81.0	LaGrange Mark	8300	2500	190
78.6	Indian Creek Light	4000	1900	240
71.2	Meridosia Bridge	N.S.	N.S.	210
55.9	Flo-Highway Bridge	N.S.	N.S.	210
23.7 T	Macoupin Ck. Bge.(Trib)	N.S.	N.S.	380
21.7	Hardin Highway Bridge	N.S.	N.S.	240

*N.S. - Not Sampled

TABLE VII-3
ISOLATION OF SALMONELLA FROM SEWAGE AND RIVER WATER
(Upper Illinois River System)
Summer and Fall, 1962

Station	No. of Samples	No. of Samples Yielding Salmonella	Organisms Identified as	No. of Isolations
North Side S.T.P.*				
Influent	4	2	Salmonella derby	1
			" montevideo	2
Effluent	3	-		
Stickney S.T.P.				
Influent	4	1	Salmonella anatum	1
Effluent	2	-		
Little Calumet River				
L.C. 322.4	2	1	Salmonella montevideo	1
Calumet S.T.P.				
Influent	5	4	Salmonella san-diego	1
			" tennessee	1
			" montevideo	3
			" senftenberg	1
			" paratyphi B, phage type 1	1
			" braenderup	3
			" infantis	3
Effluent	5	3	Salmonella oranienburg	1
			" tennessee	3
			" infantis	4
			" san-diego	1
			" braenderup	6
Cal-Sag Channel				
C.S. 317.9	1	-		
TOTAL	26	11		33

*Sewage Treatment Plant

TABLE VII-4

FREQUENCY OF VIRUS ISOLATIONS IN MONKEY KIDNEY TISSUE CULTURES AND IN SUCKLING MICE FROM SEWAGE AND RIVER WATER SAMPLES*

Chicago, Illinois, Summer and Fall, 1962

Type of specimens	No. of samples tested	No. of samples containing virus	Per cent of virus isolations	No. of Coxsackie virus isolations	No. of poliovirus isolations
	(1)	(2)	(3)	(4)	(5)
Raw sewage	49	38	77.6	7	8
Effluent	44	20	45.4	3	5
River water above treatment plants	37	10	27.0	5	3
River water below treatment plants	32	8	25.0	0	2
Total	162	76	46.9	15	18

* As of December 31, 1962.

TABLE VII-5
FREQUENCY OF VIRUS ISOLATIONS IN MONKEY KIDNEY TISSUE CULTURES
AND/OR SUCKLING MICE FROM SEWAGE AND RIVER WATER SAMPLES*
Summer and Fall, 1962

	No. of Samples Tested (1)	No. of Samples Containing Virus (2)	Per cent of virus isolations (3)	No. of Coxsackie virus isolations (4)	No. of poloiovirus isolations (5)
North Shore Channel					
NS 336.9	14	7	50.0	4	2
Northside S.T.P. **					
Influent	16	13	81.2	5	3
Effluent	16	8	50.0	3	1
NS 334.9	8	3	37.5	0	1
Sanitary and Ship Canal					
SS 317.3	12	2	16.8	1	1
Stickney S.T.P.					
Influent	16	14	87.5	1	4
Effluent	13	6	46.2	0	1
SS 314.0	12	4	33.3	0	0
Calumet Sag Channel					
LC 332.4	11	1	9.1	0	0
Calumet S.T.P.					
Influent	17	11	64.7	1	1
Effluent	15	6	40.0	0	3
LC 317.9	12	1	8.3	0	1
Total	162	76	46.9	15	18

*As of December 31, 1962
**Sewage Treatment Plant

TABLE VII-6

FREQUENCY OF VIRUS ISOLATIONS IN MONKEY KIDNEY TISSUE CULTURES AND IN SUCKLING MICE FROM SEWAGE AND RIVER WATER SAMPLES BY MONTH*

Chicago, Illinois, Summer and Fall, 1962

Month	No. of specimens tested (1)	No. of specimens containing virus (2)	Per cent of virus isolations (3)	No. of poliovirus isolations (4)	No. of Coxsackie virus isolations (5)
July	25	15	60.0	2	9
August	37	19	51.4	9	2
September	41	17	41.5	4	3
October	35	13	37.1	1	0
Total	138	64	46.4	16	14

*As of November 7, 1962

TABLE VIII- 1

MEDIAN VALUES OF SAMPLE RESULTS

INSHORE STATIONS			OFFSHORE STATIONS		
* Sta. No.	Median BOD	Median S.S.	*Sta. No.	Median BOD	Median S.S.
28	4.8	16.0	27	1.6	3.5
26	4.4	16.5	25	1.5	3.0
24	5.8	21.0	23	1.5	2.5
22	5.3	18.5	21	1.3	5.5
5	2.7	11.5	20	1.3	4.5
2	1.8	7.3	6	1.7	6.0
1	2.3	6.0	3	1.5	5.0
8	2.0	6.5	4	1.6	4.5
18	3.6	13.0	10	1.3	2.0
16	8.3	23.5	9	1.6	5.5
14	4.6	14.5	7	1.2	6.5
11	5.5	17.0	19	1.4	6.0
			17	1.4	5.5
			15	1.5	6.5
			13	1.5	8.0
			12	1.9	6.0

* Stations proceed southward at approximate halfmile intervals, beginning at a point three miles north of the intake and ending at a point three miles south of the intake.

TABLE VIII-2

SUMMARY OF AVERAGE DAILY LOADS (APRIL 24-MAY 21, 1961)
BOD

	Flow MGD	Influent 5-day BOD pH	mg/l	Tons/day	PE x10^3	Effluent 5-day BOD pH	mg/l	Tons/day	PE x10^3	% Removal	D.O. mg/l	Tons/ day	Coliform 100ml lcg. avg. x10^3
Northside 5/9-5/21	231	7.6	122	118	1,413	7.4	10.8	10.5	125	91.0	8.4	8.0	654
Calumet 5/9-5/21	138	7.4	126	72.5	870	7.4	13.5	7.7	93	89.2	6.7	3.9	268
Stickney 4/24-5/6	852(1)	7.5	164	505(2)	6,005	7.3	16.4	60	751	88.1	7.3	26	590
Totals	1238	-	-	695.5	8,288	-	-	78.2	969	-	-	37.9	

All plants %BOD reduction 88.8

(1) Flow corrected for 17 mgd recirculated W.S. sludge

(2) Corrected for recirculated W.S. sludge

TABLE VIII-3

SUMMARY OF DAILY BOD-COD LOADS SEPTEMBER 11-24

	Influent Flow-MGD Avg.	Range	5 Day BOD mg/l Avg.	Range	Tons/Day Avg.	PE Avg. x10³	Settleable BOD mg/l	%	COD mg/l	COD/BOD	Percent BOD reduction
Northside	338	238-370	50.4	9.2-131	69.7	835	-	-	136	2.5	
Calumet	183	121-222	64.7	13-171	47.2	564	-	-	181	2.8	
Stickney	1161	793-1530	90.0	26-178	428.1	5105	-		212	2.4	
TOTALS	1682	-	-	-	545	6504	-		-	-	
			Effluent								
Northside			10.5	3.5-20.0	15.0	180	2.0	19	33	3.1	78.5
Calumet			9.2	2.6-29.5	6.9	83	2.8	30	41	4.4	85.3
Stickney			9.5	1.1-32.8	44.3	530	5.0	54	38	4.0	89.7
TOTALS			-	-	66.2	793	-	-	-	-	87.8 (All Plants)

TABLE VIII-4

SUMMARY OF DAILY SOLIDS LOADS, (9/11-9/24. 1961)

	Flow MGD	Suspended Solids Tons/Day	mg/l	%Volatile	Settleable Solids Tons/Day	mg/l	%Volatile	Dissolved Solids Tons/Day	mg/l	% Reduction Susp. Solids
Influent										
Northside	338	126	92	62	96	70	61	550	390	-
Calumet	183	122	157	56	94	121	52	443	582	-
Stickney	1161	863	171	64	665	132	61	2530	496	-
TOTALS	1682	1111	-	-	855	-	-	3528	-	-
Effluent										
Northside		23.3	17	58	16.4	12	57	509	371	81.6
Calumet		14.8	19	61	9.3	12	57	479	616	87.9
Stickney		81.0	17	66	52.3	11	77	2250	472	90.6
TOTALS		119.1			78.0			3238		89.3

$$\text{Settleable Suspended Solids} = \frac{78}{119.1} = 65\%$$

TABLE VIII-5

SUMMARY OF DAILY DISCHARGES (9/11-9/24, 1961)

	Nitrogen $NO_2 + NO_3$ as N mg/L	NH3 as N mg/L	Organic as N mg/L	Total as N Tons/Day	Phosphate Ortho as PO4 mg/L	Total as PO4 mg/L	Total PO4 Tons/Day
Northside	2.8	2.3	1.8	7.8	5.8	6.2	8.7
Calumet	4.0	2.9	1.9	5.9	2.0	2.8	2.2
Stickney	2.3	1.3	2.0	27.8	0.8	1.0	4.8
TOTALS				41.5			15.7
Average Conc. All Plants	2.6	1.7	1.9		1.9	2.2	

	ABS mg/L	ABS Tons/Day	Chloride mg/L	Chloride Tons/Day	Dissolved Oxygen mg/L	Dissolved Oxygen Tons/Day	pH Av.
Northside	1.5	2.1	33	46.5	7.1	10.0	7.5
Calumet	1.8	1.4	56	43.3	6.8	5.0	7.5
Stickney	1.5	7.0	65	305.0	6.6	31.0	7.5
TOTALS		10.5		394.8		46.3	
Average Conc. All Plants	1.6		58		6.7		

TABLE VIII-6
SUMMARY OF BACTERIAL DATA

	Date	Influent Coliforms/ 100ml x10^3	Influent Fecal Strep/ 100ml x10^3	Influent Coli/ FS Ratio	Effluent Coliforms/ 100ml x10^3	Effluent Fecal Strep/ 100ml x10^3	Effluent Coliforms/ FS Ratio
Northside	9/21	9,900	1,270	8.0	340	27	12.7
Calumet	9/21	8,100	1,732	4.8	300	52	6.6
Stickney	9/12-13	10,100	2,500	7.0	110	59	1.9
"	9/20-21	40,000	15,000	2.6	340	140	2.4

	%Reduction Coliforms	%Reduction Fecal Strep
Northside	96.4	97.9
Calumet	95.8	97.0
Stickney	99.4	97.6
"	99.2	99.1

TABLE VIII - 7

ROSCOE STREET SEWER

LAND USE AND IMPERVIOUSNESS

Land Use	Area (Sq. Mi.)	Imperviousness[1] (Percent)	Impervious Area (Sq. Mi.)
Residential	3.77	30	1.13
Commercial	0.42	56	0.24
Industrial	0.16	38	0.06
Public Buildings	0.51	50	0.26
Transportation	0.12	20	0.02
Parking	0.02	90	0.02
Streets and Alleys	2.72	70	1.90
Public Open Space	0.47	0	0.0
Vacant Land	0.42	0	0.0
Total	8.61		3.63

(1) Average imperviousness for each land use in Chicago sewered area tributary to North Side Treatment Plant, by Mr. C. J. Kiefer, Sewer Planning Division, Bureau of Engineering, City of Chicago.

TABLE VIII-8

ROSCOE STREET SEWER
QUALITY OF DRY WEATHER FLOW
(October, 1961)

Constituent	Average Concentration (mg/l)	Average Load (lb/day)
B.O.D. (5-day)	104	25,200
C.O.D.	184	44,600
Chloride	33	8,010
A.B.S.	2.70	655
Alkalinity	179	43,400
Nitrogen		
NH_3	8.27	2,010
Organic	7.52	1,820
NO_2 and NO_3	0.45	109
Phosphates		
Ortho	9.00	2,180
Poly	2.95	716
Total Solids	411	99,700
Suspended Solids	61	14,800
Settleable Solids	29	7,040
Dissolved Solids	343	83,200

TABLE VIII-9

ROSCOE STREET SEWER

OVERFLOWS

Month	Number of Overflows	Duration, hours	
		Total	Average
September 1961 (1)	1	2.5	2.5
October 1961	5	32.2	6.4
November 1961	3	18.0	6.0
December 1961	1	1.5	1.5
March 1962 (1)	1	0.8	0.8
April 1962	2	5.3	2.6
May 1962	7	21.9	3.1
June 1962	3	8.3	2.8
July 1962	5	26.1	5.2
August 1962	3	9.3	3.1
September 1962	2	4.1	2.0
October 1962	2	5.2	2.6
November 1962	1	4.7	4.7
Totals	36	139.9	3.9

(1) Partial Month

TABLE VIII - 10

ROSCOE STREET SEWER

RAINFALL AND RUNOFF

Storm Date	Rainfall			Runoff (Inches)	Runoff / Rainfall (%)
	Depth (Inches)	Duration (Hours)	Average Intensity (In./Hr.)		
Oct. 11, 1961	0.35	4	0.088	0.103	29.4
Oct. 13, 1961	0.28	3	0.093	0.054	19.3
Oct. 19-20, 1961	1.34	21	0.064	0.567	42.3
Oct. 29, 1961	0.38	4	0.095	0.240	63.1
Oct. 29-30, 1961	0.47	6	0.078	0.280	59.6
Nov. 2- 3, 1961	0.54	13	0.042	0.355	65.7
Nov. 15-16, 1961	0.38	9	0.042	0.260	68.4
Nov. 22, 1961	0.16	4	0.040	0.130	81.2
Dec. 11-12, 1961	0.25	7	0.036	0.119	47.6
Apr. 5, 1962	0.24	4	0.060	0.109	45.4
Apr. 8, 1962	0.41	5	0.082	0.198	48.3
May 1, 1962	0.26	4	0.052	0.075	28.8
May 7- 8, 1962	0.95	7	0.136	0.368	38.7
May 10, 1962	0.215	4	0.052	0.059	27.4
May 10, 1962	0.036	1	0.036	0.011	30.6
May 12, 1962	0.77	3	0.257	0.296	38.4
May 21, 1962	0.514	2	0.257	0.124	24.1
May 21, 1962	0.140	3	0.047	0.078	55.7
June 5- 6, 1962	0.50	2	0.25	0.134	26.8
June 8, 1962	0.72	4	0.18	0.250	34.7
June 11, 1962	0.14	1	0.14	0.035	25.0
July 2, 1962	3.17	7	0.453	1.536	48.5
July 11, 1962	0.857	4	0.214	0.214	25.0
July 15, 1962	0.185	2	0.092	0.033	17.8
July 22, 1962	0.562	4	0.140	0.183	32.6
July 28, 1962	0.322	8	0.040	0.138	42.9
Aug. 6, 1962	1.383	9	0.154	0.439	31.7
Aug. 7, 1962	0.217	4	0.054	0.138	63.6
Aug. 24, 1962	0.149	3	0.050	0.041	27.5
Sept. 9, 1962	0.319	2	0.160	0.045	14.1
Sept. 10, 1962	0.692	4	0.173	0.297	43.0
Oct. 20, 1962	0.477	6	0.080	0.142	29.8
Oct. 20, 1962	0.196	4	0.049	0.066	33.7
Nov. 16, 1962	0.379	13	0.029	0.204	53.7

TABLE VIII-11a
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF NOVEMBER 2-3, 1961

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
						DIVERSION CHAMBER						
1730-1830	73	133	36						318	68	28	--
1830-2207	115	149	33	2.88	3.46	2.28	6.61	3.65	334	66	38	--
2207-2237	72	131	36						354	66	38	--
2237-2307	148	237	30	2.88	4.19	15.15	7.44	3.85	412	178	138	--
2307-2322	143	242	27						432	198	140	--
2322-2352	162	196	28	3.73	4.19	1.87	7.16	1.73	376	130	98	--
2352-0030	150	170	29						386	154	118	--
0030-0152	85	137	22	2.78	2.57	2.25	6.84	0.00	330	98	68	--
0200 (Start Overflow)												
0152-0330	52	107	17	2.53	1.99	1.83	4.10	0.77	312	48	24	--
0330-0530	25	78	21	1.26	0.51	1.84	1.36	0.56	276	44	22	--
0530-0730	16	58	14						254	46	18	--
0730-0945	23	73	22	0.70	0.22	4.34	1.62	.00	292	60	24	--
0945-1145	27	87	28	0.98	1.79	3.50	4.26	.02	360	64	44	--
1120 (End Overflow)												
1145-1345	30	82	26						378	68	44	--
1345-1545	39	92	24	1.30	1.69	2.87	5.16	0.83	400	48	28	--

TABLE VIII-11b.
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF NOVEMBER 2-3, 1961

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen		Phosphate		Solids			
					NH_3	Organic	Ortho	Poly	Total	Suspended	Settleable	Dissolved
					OVERFLOW							
1730-1830	13	18	44									
1830-2207	24	34	43	1.9	2.13	0.52	7.16	.00	448	108	88	--
2207-2307									564	138	124	--
2307-0030	7	58	45	2.00	1.99	0.00	6.25	.00				
0030-0152	49	119	27	2.25	1.83	0.82	6.27	.00	466	38	24	--
0200 (Start Overflow)				3.62	4.34	0.44	6.21	1.92	308	24	--	--
0152-0330	46	112	20	2.47	5.07	0.30	4.26	1.38	230	28	18	--
0330-0530	34	105	17	1.36	0.66	2.13	2.26	1.50	202	38	22	--
0530-0745	15	52	12						156	32	6	--
0745-0945	16	64	20	0.73	0.36	2.65	1.32	0.05	192	34	14	--
0945-1130	22	60	15	0.65	1.69	3.46	2.81	0.29	194	26	6	--
1120 (End Overflow)												
1130-1330	21	75	23									
1330-1530	28	82	25	1.05	2.32	2.36	3.44	1.95	298	54	50	--
									338	40	36	--

TABLE VIII- 12a
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF NOVEMBER 15-16, 1961

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
					DIVERSION CHAMBER							
1030-1130	101	193	31									
1130-1530	210	361	30	1.8	7.1	5.5	13.6	2.1	510	90	40	420
1530-1930	90	218	27						616	82	50	534
1930-2152	78	177	30	3.2	4.4	2.2	9.7	1.8	428	84	62	344
2152-2222	101	155	29						406	70	40	336
2222-2252	65	165	31	4.0	4.6	2.3	10.7	0.8	400	62	38	338
2252-2322	116	230	34						416	80	62	336
2322-2352	149	319	31	3.7	5.2	3.2	11.3	1.0	492	168	138	324
2352-0022	136	317	24						536	266	228	270
0037-0052	79	200	22	3.5	4.0	4.2	9.8	0.7	508	222	180	286
0100 - (Start Overflow)									408	138	108	270
0052-0122	77	203	20									
0122-0152	88	240	18	3.2	3.3	4.0	7.3	0.1	348	120	64	228
0152-0222	63	204	16						384	174	124	210
0222-0252	58	187	14	2.2	3.7	1.5	4.1	0.2	348	166	142	182
0252-0322	48	201	12						306	140	104	166
0322-0437	25	132	17	1.6	1.1	3.4	2.4	0.4	302	174	124	128
0640 (End Overflow)									266	96	56	170
0437-0900	38	91	11	1.1	1.1	1.8	1.5	0.3	210	58	48	152
0900-1230	35	113	29						350	74	44	276
1230-1430	60	192	36	1.6	--	--	5.6	0.9	430	92	88	338
1430-1530	93	250	43	2.6	--	--	7.2	2.4	514	148	108	336

TABLE VIII-12b
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF NOVEMBER 15-16, 1962

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
					— OVERFLOW —							
1030-1130	30	132	44	1.6	--	--	5.6	0.6	694	236	196	458
1130-1530	34	142	44						686	240	204	446
1530-2152	38	221	47	1.9	6.4	1.8	9.8	0.0	786	386	350	400
2152-2252	115	563	46	2.3	4.8	11.0	8.9	0.1	1142	772	674	370
2252-2352	600	4350	33	2.1	10.6	49.3	9.3	0.3	4720	3960	3790	760
2352-0052	84	213	28	2.7	5.2	0.6	5.8	0.4	441	111	96	330
0100 (Start Overflow)												
0052-0122	69	157	26	2.9	3.8	2.1	5.7	0.9	359	72	33	287
0122-0152	82	180	17						377	127	91	250
0152-0222	68	175	14	2.2	2.2	3.5	3.2	0.8	349	133	65	216
0222-0252	48	139	14						305	107	70	163
0252-0322	52	164	13	1.4	1.0	3.3	1.8	0.7	353	171	116	182
0322-0437	31	118	11						241	81	45	160
0640 (End Overflow)												
0437-0900	20	90	12	1.3	1.1	1.7	2.0	0.1	205	54	32	152
0900-1430	10	73	28	1.6	8.7	--	5.2	0.4	292	32	20	260
1430-1530	--	82	35						316	22	14	294

TABLE VIII - 13
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF MAY 8, 1962

All Values in Milligrams per Liter

Time Interval	5-Day POD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
DIVERSION CHAMBER												
1900 (Start Overflow)												
2340-0028	35	131	31	1.08	0.23	2.87	1.10	.20	330	--	--	--
0028-0053	23.6	103	33	0.92	0.02	2.53	1.06	.27	291	--	--	--
0053-0115	21.8	99	30	0.77	--	--	1.14	0.07	299	--	--	--
0115-0145	21.8	68	30	0.72	0.39	1.71	1.06	0.19	281	--	--	--
0145-0215	22.4	72	46	0.72	0.33	1.71	1.04	0.25	312	--	--	--
0215-0245	20.2	71	86	0.74	0.33	2.01	0.94	0.19	381	--	--	--
0250 (End Overflow)												
0245-0330	20.2	81	110	0.73	0.09	1.82	1.18	0.29	433			
OVERFLOW												
1900 (Start Overflow)												
0000-0042	27.3	109	22	0.90	0.04	2.41	1.05	0.31	328	--	--	--
0042-0105	20.2	78	20	0.79	0.15	2.35	1.22	0.35	209	--	--	--
0105-0135	18.7	78	20	0.79	--	--	1.18	0.12	163	--	--	--
0135-0200	16.1	70	22	0.79	0.35	1.58	1.01	0.31	146	--	--	--
0200-0230	15.3	62	21	0.79	0.02	2.01	1.12	0.63	184	--	--	--
0250 (End Overflow)												
0230-0300	15.1	62	23	0.72	0.13	--	1.20	0.25	153	--	--	--
0300-0345	15.4	58	24	0.79	0.07	1.87	1.26	1.23	192	--	--	--

TABLE VIII-14
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF MAY 10, 1962

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
—— DIVERSION CHAMBER ——												
0900-1000	71	228	28	1.6	3.07	3.27	2.20	0.34	316	132	--	184
1000-1100	94	755	29	1.4	3.07	4.58	2.70	--	385	174	--	211
1100 (Start Overflow)												
1100-1137	153	1081	91	1.3	3.31	4.78	6.95	--	556	116	--	440
1137-1152	151	474	44	1.4	3.84	4.76	7.30	1.15	423	70	--	353
1140 (End Overflow)												
1152-1230	147	3429	35	1.7	5.54	20.21	6.95	1.40	--	462	--	--
1230-1330	154	3959	25	1.4	5.60	38.5	7.45	3.85	3028	2626	--	402
1330-1430	150	1558	20	1.5	4.59	4.33	7.55	4.95	943	334	--	609
—— OVERFLOW ——												
0900-1000	132	124	36	1.6	2.35	3.81	2.06	0.70	359	124	--	235
1000-1100	130	135	22	1.4	--	--	1.96	0.20	298	126	--	172
1100 (Start Overflow)												
1100-1137	62	92	23	1.5	--	--	3.06	1.30	304	82	--	222
1137-1252	70	102	30	1.4	4.17	3.09	3.71	0.58	294	64	--	230
1140 (End Overflow)												
1252-1430	52	53	30	1.2	2.74	2.13	3.52	0.84	323	70	--	353

TABLE VIII- 15a
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF JULY 2 - 3, 1962

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
					DIVERSION CHAMBER							
1040 (Start Overflow)												
1100-1152	150	420	10	0.70	0.67	6.85	-	-	624	452	290	172
1152-1222	86	197	9						545	429	338	116
1222-1252	42	143	10		0.17	3.16			383	241	159	142
1252-1322	27	122	12						300	144	76	156
1322-1352	30	116	11	0.43	0.39	2.32			360	226	138	134
1352-1422	19	134	20						447	307	189	140
1422-1452	33	165	17		1.24	5.04			572	402	236	170
1452-1645	13	174	25	0.34	0.06	2.90	-	-	786	508	288	278
1645-1845	17	422	47	0.60	0.11	3.40	-	-	915	509	289	406
1845-2045	16	102	55	0.69	0.56	2.40	-	-	688	112	30	576
2045-2245	16	124	61	1.17	0.22	3.66	-	-	640	52	14	588
2245-0045	24	77	53	0.89	0.50	3.13	-	-	589	55	29	534
0130 (End Overflow)												
0045-0200	57	36	39	1.26	1.12	5.10	-	-	583	-	-	-
1000-1200	23	78	57	0.63	3.29	4.60	-	-	545	59	40	486
1200-1400	65	94	49	1.04	2.46	5.79	-	-	638	145	124	493

TABLE VIII- 15b
ROSCOE STREET SEWER
LABORATORY ANALYSES
STORM OF JULY 2 - 3, 1962

All Values in Milligrams per Liter

Time Interval	5-Day BOD	COD	Chloride	ABS	Nitrogen NH_3	Nitrogen Organic	Phosphate Ortho	Phosphate Poly	Solids Total	Solids Suspended	Solids Settleable	Solids Dissolved
					—— OVERFLOW ——							
1040 (Start Overflow)												
1100-1152	123	353	9	0.86	0.17	6.61	-	-	833	667	537	166
1152-1222	81	225	8						464	350	222	114
1222-1307	36	184	10		0.39	2.87			404	288	200	116
1307-1337	42	-	10						358	216	154	142
1337-1407	45	146	14	0.60			-	-	410	266	170	144
1407-1437	23	129	11		0.28	2.92			431	327	233	104
1437-1552	17	100	21	-					581	426	372	155
1552-1737	22	161	32	0.52	0.06	3.64	-	-	578	273	179	305
1752-1952	21	82	52	0.67	0.06	3.57	-	-	599	136	98	463
1952-2152	18	48	57	0.77	0.28	3.66	-	-	557	-	-	531
2152-2322	15	41	57	0.95	0.22	3.78	-	-	560	-	-	539
2322-0037	15	52	54	1.18	0.45	3.68	-	-	653	-	74	563
0130 (End Overflow)												
0037-0200	12	48	57	0.80	0.84	2.98	-	-	346	-	-	552
0945-1230	5	34	42	0.72	-	-	-	-	445	-	-	481
1230-1530	18	14	43	0.70	-	-	-	-	433	18	1	415

TABLE VIII-16

DAILY 5-DAY BOD LOAD TO CANAL SYSTEM

Period of Time After Overflow Starts	Overflow		5-Day BOD	
	(cu.ft. X 10^6)	(lb. X 10^6)	(mg/l)	(lb.)
First 30 minutes	19.15	1195.64	69.5	83,100
Second " "	15.87	990.92	61.5	60,900
Third " "	10.07	628.57	54.0	33,900
Fourth " "	7.71	481.45	48.0	23,100
Fifth " "	5.18	323.46	42.5	13,700
Sixth " "	4.06	253.68	37.0	9,400
Fourth 60 minutes	11.23	701.08	30.5	21,400
Fifth " "	10.54	657.91	24.5	16,100
Sixth " "	5.21	325.13	20.5	6,700
Seventh " "	2.49	155.44	17.5	2,700
Eighth " "	1.39	86.75	15.5	1,300
Ninth " "	1.03	64.05	15.0	1,000
10 to 20 Hours	5.35	333.91	15.0	5,000
Total overflow BOD load to canal				278,300

ROSCOE STREET SEWER

Period of Record = 9 months (275 days)

Average overflow BOD load to canal = $\frac{278,300}{275}$ = 1,010 lb./day

Average DWF BOD load = 25,200 lb./day

TOTAL AREA

Treatment Plant	Daily BOD Load to Plant, lb./day	Daily BOD Load to Canals, lb./day
North Side	178,400	7,100
Stickney	887,000	35,500
Calumet	106,500	4,300
Total BOD load to canal system		46,900 lb./day

TABLE IX-1

KNOWN SOURCES BIOCHEMICAL OXYGEN DEMAND LOADS
UPPER ILLINOIS RIVER SYSTEM MAINSTEM
L-U Ultimate BOD in pounds per day

Source	April-May 1961	June 1961	July 1961	August 1961	January 1962	Averages (5 periods)
Station No. 1	27960	26070	15060	10990	890	16,190
NSSTP	18180	23150	19490	29820	29560	24,040
N.R.N.Br.Chgo.R.	7470	2210	1840	950	3590	3,210
Chicago River	12000	11430	12780	8030	10020	10,850
S-SWSTP	101460	171590	100020	97470	140500	122,210
Cal-Sag Channel (39)	28500	20850	22750	13070	22200	21,470
Totals	195,570	255,300	171,940	160,330	206,760	197,970

Estimated Average Mid-Station Changes from 5 Study Periods:

+ Loads = + 157250 Ultimate BOD pounds per day
- Loads = - 82900 " " " " "

Estimated Annual Average Storm Spillage based on Study of 31 Storms = 56000 Ultimate BOD pounds per day
Estimated Industrial Waste Loads Mid-Station = 54300 " " " " "
Total = 110300 Ultimate BOD pounds per day

Loadings Accounted for: $\frac{110300}{157250} = 70\%$

TABLE NO. IX-2

ESTIMATED MID-STATION BIOCHEMICAL OXYGEN DEMAND CHANGES
UPPER ILLINOIS RIVER SYSTEM
L-U Ultimate BOD in pounds per day

Station Reach	April-May 1961	June 1961	July 1961	August 1961	January 1962	Remarks
1-2	+240	-1000	-1770	-2730	+290	
2-3	+3480	+3700	+2670	+4900	+1200	
3+NSP-4	+13540	+4500	-9550	-10180	-50	
4-5	-7930	+5600	+4910	-2920	-3410	
5+6-7	-7770	+3600	-1070	-230	-2200	
7-8	+17210	+27500	+13450	+10630	-1170	Low velocity; large drainage area
8-9	+6760	-11900	+5380	-1980	-1910	
9+Chicago R.	-13280	-8000	-5290	-5290	-1970	
12-13	+4600	+7500	+3420	+5200	+1510	
13-14	+8090	+32000	+16540	+21000	+7470	Low velocity; large drainage area
14-15	+12520	+26000	+10690	+28550	+17690	Low velocity; large drainage area
15+S-SWP-16	+64210	-61000	+85860	+4810	+6560	Low velocity; large drainage area
16-17	+14700	+24000	+15210	-5510	-20490	Low velocity; large drainage area
17-18	-26790	+39000	-44450	-9680	-8780	
18+C.S.-19	-4540	-66000	+18990	+40540	+3120	
19-20	-7700	+35000	-15920	-4160	-6590	
20-21	+13270	+25000	+38380	+19910	-11230	Decreased velocity above dam
21-22	-9080	-7000	+1020	+2280	+2070	
Des Plaines R.	--	--	--	--	--	
Totals	+158,620 - 77,090	+233,400 -154,900	+216,520 - 78,050	+137,820 - 42,680	+39910 -57800	Average + 157,250 Average - 82,900

TABLE NO. IX-3

NET BOTTOM SLUDGE-DISSOLVED OXYGEN DEMAND

BASED ON CALCULATED DISSOLVED OXYGEN FROM STATION A TO STATION B AND OBSERVED DISSOLVED OXYGEN AT STATION B

UPPER ILLINOIS RIVER SYSTEM

Station Reach	POUNDS BOTTOM SLUDGE OXYGEN DEMAND/DAY					
	April-May 1961	June 1961	July 1961	August 1961	January 1962	Remarks
1-2	-	-	-	640	170	
2-3	1100	1200	2010	3140	700	
3-NSP	-	-	-	-	-	
NSP-4	670	2900	3600	3670	6190	Below plant outfall
4-5	60	1600	3600	3430	1000	Large storm drainage area
5+6-7	9990	13580	7700	11140	5130	Large storm drainage area
7-8	9700	11630	15170	13370	2920	Large storm drainage area
8-9	3920	3730	5500	6900	-	
9-J. Chicago R.	-	-	-	-	-	
9+J-12	-	-	-	-	-	
12-13	3350	5370	950	11520	-	Large storm drainage area
13-14	-	-	-	-	-	
14-15	-	-	-	1920	-	
15- SWP	-	-	-	-	-	
SWP-16	1580	570	11120	10130	24050	Below plant outfall
16-17	23910	3000	-	7580	5470	
17-18	2520	-	-	-	2200	
18-J.C.S.	-	-	-	-	-	
J.C.S.-19	-	-	-	-	4160	
19-20	210	-	-	-	-	
20-21	-	-	-	-	350	
21-22	-	5690	410	-	10890	
22-J.D.P.R.	-	-	-	-	-	
Total	57030	49270	50060	73410	63230	
Total for 5 periods	293000	Average - 58600 pounds Lu per day				

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX-4a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
1	340.7			750	27960								
2	338.6	2.1	0.167	750		+240	-1000	-760					(1)
2	338.6	2.1		750	27270				27200	6.73	27270	6.75	
3	336.9	3.8	0.108	750		+3480	-660	+2820					
3	336.9	3.8		750	30170				30090	7.42	30170	7.44	
NSP	336.6	4.1	0.039	750		-	-250	-250					
NSP	336.6	4.1	0.039	340	-	-	-	-	29930	7.38	-	-	
3+NSP	336.6	4.1		1130	48100				-	-	18180	10.02	
4	334.9	5.8	0.026	1130		+13540	-330	+13210					
4	334.9	5.8		1130	63110				61310	10.00	63110	10.37	
5	333.4	7.3	0.054	1130		-7930	-720	-8650					
N.Br.,6	333.4	7.3	-	100	-	-	-	-	54460	8.92	54720	8.96	
5+6	333.4	7.3		1230	62190				-	-	7470	14.12	
7	331.4	9.3	0.108	1230		-7770	-1410	-9180					
7	331.4	9.3		1230	53160				53020	7.97	53160	7.99	
8	329.0	11.7	0.252	1240		+17210	-3380	+13830					
8	329.0	11.7		1240	67350				66980	10.00	67350	10.05	
9	325.8	14.9	0.407	1250		+6760	-6280	+480					
									67830	10.05	68310	10.12	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX - 4b STREAM: Upper Illinois Waterway

Reach Sta.A to Sta.B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
9	325.8	14.9	0.036	1250	68310	-	-560	-560					
J.Chg.R.	325.6	15.1		1250					67750	10.04	-	-	
Chg.R.	325.6	15.1	-	550	-	-	-	-	-	-	12000	4.07	
9+Chg.R.	325.6	15.1	0.115	1800	79750	-13280	-1850	-15130					
12	324.3	16.4		1800					64620	6.67	64460	6.65	
12	324.3	16.4	0.224	1800	64460	+4600	-3260	+1340					
13	322.8	17.9		1820					65800	6.69	66770	6.79	
13	322.8	17.9	0.390	1820	66770	+8090	-5920	+2180					
14	320.0	20.7		1880					68940	6.79	71100	7.00	
14	320.0	20.7	0.347	1880	71100	+12520	-6300	+6220					
15	317.3	23.4		1930					77320	7.44	79000	7.60	
15	317.3	23.4	0.115	1930	79000	-	-2480	-2480					
WSWP	315.8	24.9		1920					76530	7.38	-	-	
WSWP	315.8	24.9	-	1250	-	-	-	-	-	-	101460	15.03	
15+WSWP	315.8	24.9	0.137	3240	177980	+64210	-8190	+56020					
16	314.0	26.7		3240					234000	13.37	237670	13.58	
16	314.0	26.7	0.472	3240	237670	+14700	-32560	-17860					
17	307.9	32.8		3330					219810	12.23	225610	12.55	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX-4c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, Da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
17	307.9	32.8		3330	225610								
			0.261			-26790	-15910	-42700					
18	304.1	36.6		3330					182920	10.18	182830	10.17	
18	304.1	36.6		3330	182830								
			0.054			-	-2870	-2870					
J.CalSag.	303.4	37.3		3330					179960	10.01	-	-	
Cal.Sag.	303.4	37.3	-	740	-	-	-	-	-	-	28500	7.12	
18+CalSag.	303.4	37.3		4070	208450								
			0.193			-4540	-11120	-15660					
19	300.5	40.2		4000					192800	8.93	189170	8.76	
19	300.5	40.2		4000	189170								
			0. 79			-7700	-14180	-21880					
20	296.2	44.5		3930					167300	7.88	164300	7.74	
20	296.2	44.5		3930	164300								
			0.301			+13270	-14430	-1160					
21	292.1	48.6		3860					163140	7.82	160380	7.69	
21	292.1	48.6		3860	160380								
			0.090			-9080	-4180	-13250					
22	291.1	49.6		3800					147130	7.18	144510	7.05	
22	291.1	49.6		3800	144510								
			0.077			-	-3330	-3330					
J.DesPl.	290.0	50.7		3800					141190	6.89	-	-	

(1) All ultimate BOD values were calculated with K_1, 20°C = 0.139 da. $^{-1}$

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX-5a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
1	340.7		0.167	750	48660	-1000	-450	+1010	-435	49100	12.15	48510	12.01	
2	338.6	2.1		750										
2	338.6	2.1	0.108	750	48510	-660	-215	-1100	-1970	46540	11.48	46680	11.51	
3	336.9	3.8		750										
3	336.9	3.8	0.039	750	46680	-250	-25	-	-270	46410	11.44	-	-	
NSP	336.6	4.1		750										
NSP	336.6	4.1	0.039	340	-	-	-	-	-	-	-	14510	8.0	
3+NSP	336.6	4.1	0.026	1130	60920	-330	+90	-670	-910	60010	9.86	60190	9.89	
4	334.9	5.8		1130										
4	334.9	5.8	0.054	1130	60190	-720	+230	-60	-550	59640	9.77	59060	9.67	
5	333.4	7.3		1130										
N.Br.,6	333.4	7.3	-	100	-	-	-	-	-	-	-	4980	9.40	
5+6	333.4	7.3	0.108	1230	64620	-1410	+890	-9990	-10500	54120	8.13	54490	8.19	
7	331.4	9.3		1230										
7	331.4	9.3	0.252	1230	54490	-3380	+2050	-9720	-11050	43450	6.48	42820	6.39	
8	329.0	11.7		1240										
8	329.0	11.7	0.407	1240	42820	-6280	+2450	-3920	-7750	35080	5.20	35170	5.21	
9	325.8	14.9		1250										

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX-5b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
9	325.8	14.9		1250	35170									
			0.036			-560	+200	-	-370					
J.Chg.R.	325.6	15.1		1250						34810	5.16	-	-	
Chg.R.	325.6	15.1	-	550	-	-	-	-	-	-	-	27890	9.46	
9+Chg.R.	325.6	15.1		1800	62700									
			0.115			-1850	+360	+290	-1210					
12	324.3	16.4		1800						61490	6.34	61550	6.35	
12	324.3	16.4		1800	61550									
			0.224			-3260	+790	-3350	-5820					
13	322.8	17.9		1820						55740	5.67	56440	5.74	
13	322.8	17.9		1820	56440									
			0.390			-5920	+2150	+3760	-20					
14	320.0	20.7		1880						56430	5.56	54340	5.35	
14	320.0	20.7		1880	54340									
			0.347			-6300	+3020	+1980	-1310					
15	317.3	23.4		1930						53030	5.10	47820	4.60	
15	317.3	23.4		1930	47820									
			0.115			-2480	+1030	-	-1450					
WSWP	315.8	24.9		1920						46370	4.47	-	-	
WSWP	315.8	24.9	-	1250	-	-	-	-	-	-	-	47930	7.10	
15+WSWP	315.8	24.9		3240	94290									
			0.137			-8190	+2600	-1580	-7170					
16	314.0	26.7		3240						87130	4.98	76310	4.36	
16	314.0	26.7		3240	76310									
			0.472			-32560	+11880	-23910	-44590					
17	307.9	32.8		3330						31720	1.76	32360	1.80	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: APRIL-MAY, 1961 TABLE NO. IX-5c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
17	307.9	32.8		3330	32360									
			0.261			-15910	+4080	-2520	-14350					
18	304.1	36.6		3330						18020	1.00	19780	1.10	
18	304.1	36.6		3330	19780									
			0.054			-2870	+710	-	-2160					
J.CalSag	303.4	37.3		3330						17620	0.98	-	-	
Cal.Sag	303.4	37.3	-	740	-	-	-	-	-	-	-	9720	2.43	
18+CalSag	303.4	37.3		4070	27340									
			0.193			-11120	+2980	+5190	-2960					
19	300.5	40.2		4000						24380	1.13	23970	1.11	
19	300.5	40.2		4000	23970									
			0.279			-14180	+4820	-210	-9570					
20	296.2	44.5		3930						14400	0.68	16140	0.76	
20	296.2	44.5		3930	16140									
			0.301			-14430	+7760	+6680	+10					
21	292.1	48.6		3860						16150	0.77	12100	0.58	
21	292.1	48.6		3860	12100									
			0.090			-4180	+1340	+13740	+10900					
22	291.1	49.6		3800						22990	1.12	22550	1.10	
22	291.1	49.6		3800	22550									
			0.077			-3330	+2370	-	-960					
JDesPl.	290.0	50.7		3800						21590	1.05	-	-	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-6a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
1	340.7				26070								
			0.101	860		-1000	-680	-1680					
2	338.6	2.1							24390	5.21	24490	5.23	
			0.067	865	24490	+3700	-500	+3200					
3	336.9	3.8							27690	5.87	27470	5.82	
			0.012	870	27470	-	-100	-100					
NSP	336.6	4.1							27370	5.80	27370	5.80	
NSP	336.6	4.1	-	410	-	-	-	-	-	-	23150	10.53	
			0.046	1270	50520	+4500	-640	+3860					
3+NSP	336.6	4.1							54380	7.91	54030	7.86	
4	334.9	5.8											
			0.045	1280	54030	+5600	-670	+4930					
5	333.4	7.3							58960	8.56	59420	8.63	
N. Br.,6	333.4	7.3	-	45	-	-	-	-	-	-	2210	9.53	
			0.096	1320	61630	+3600	-1540	+2060					
5+6	333.4	7.3							63690	8.90	62720	8.76	
7	331.4	9.3											
			0.225	1320	62720	+27500	-4620	+22880					
8	329.0	11.7							85600	11.93	85190	11.87	
			0.365	1330	85190	-11900	-8420	-20320					
9	325.8	14.9							64870	9.00	64880	9.00	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-6b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles Frcm Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
9	325.8	14.9	0.032	1330	64880	-	-660	-660					
J.Chg.R.	325.6	15.1							64230	8.91	64230	8.91	
Chg.R.	325.6	15.1	-	490	-	-	-	-	-	-	11430	4.32	
9+Chg.R.	325.6	15.1	0.191	1820	75660	-8000	-4850	-12850					
12	324.3	16.4							62800	6.37	62380	6.33	
12	324.3	16.4	0.216	1830	62380	+7500	-5540	+1960					
13	322.8	17.9							64340	6.52	64360	6.52	
13	322.8	17.9	0.379	1850	64360	+32000	-9990	+22010					
14	320.0	20.7							86370	8.52	86100	8.49	
14	320.0	20.7	0.346	1870	86100	+26000	-10390	+15610					
15	317.3	23.4							101710	10.00	103510	10.18	
15	317.3	23.4	0.195	1880	103510	-	-6170	-6170					
WSWP	315.8	24.9							97340	9.57	97340	9.57	
WSWP	315.8	24.9	-	1360	-	-	-	-	-	-	171590	23.40	
15+WSWP	315.8	24.9	0.138	3200	268900	-61000	-14270	-75270					
16	314.0	26.7							193660	11.19	193670	11.19	
16	314.0	26.7	0.479	3210	193670	+24000	-44710	-20710					
17	307.9	32.8							172960	9.97	170850	9.85	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-6c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
17	307.9	32.8			170850								
			0.268	3210		+39000	-16310	+22690					
18	304.1	36.6							193530	11.15	192880	11.11	
			0.055	3220	192880								
J.CalSag.	303.4	37.3				-	-2780	-2780					
									190100	10.95	190100	10.95	
CalSag	303.4	37.3	-	545	-	-	-	-	-	-	20850	7.10	
18+CalSag	303.4	37.3			210960								
			0.204	3760		-66000	-12380	-78380					
19	300.5	40.2							132580	6.51	135380	6.65	
			0.290	3780	135380								
20	296.2	44.5				+35000	-15250	+19750					
									155130	7.60	153580	7.52	
20	296.2	44.5			153580								
			0.306	3790		+25000	-13980	+11020					
21	292.1	48.6							164600	8.04	164720	8.04	
21	292.1	48.6			164720								
			0.090	3800		-7000	-3960	-10960					
22	291.1	49.6							153770	7.48	153320	7.46	
			0.076	3810	153320								
J.DesPl.	290.0	50.7				-	-3190	-3190					
									150130	7.30	150130	7.30	

(1) The K_1, 20°C values were calculated at 9 stations and these values were used to make estimates at the remaining stations.

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-7a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaer-ation A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
1	304.7				51120									
			0.101	860		-680	-260	+560	-380					
2	338.6	2.1								50750	10.84	51220	10.94	
2	338.6	2.1			51220									
			0.067	865		-500	-130	-1200	-1820					
3	336.9	3.8								49400	10.47	49800	10.55	
3	336.9	3.8			49800									
			0.012	870		-100	-20	-	-110					
NSP	336.6	4.1								49680	10.53	49700	10.53	
NSP	336.6	4.1	-	410	-	-	-	-	-	-	-	16710	7.60	
3+NSP	336.6	4.1			66410									
			0.046	1270		-640	+210	-2900	-3330					
4	334.9	5.8								63080	9.18	60560	8.81	
4	334.9	5.8			60560									
			0.045	1280		-670	+280	-1600	-1990					
5	333.4	7.3								58570	8.51	58660	8.52	
N.Br.,6	333.4	7.3	-	45	-	-	-	-	-	-	-	1720	7.40	
5+6	333.4	7.3			60380									
			0.096	1320		-1540	+1220	-13580	-13890					
7	331.4	9.3								46490	6.49	47260	6.60	
7	331.4	9.3			47260									
			0.225	1320		-4620	+1860	-11630	-14390					
8	329.0	11.7								32870	4.58	30500	4.25	
8	329.0	11.7			30500									
			0.365	1330		-8420	+3130	-3730	-9020					
9	325.8	14.9								21490	2.98	21560	2.99	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-7b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
9	325.8	14.9	0.032	1330	21560	-660	+160	-	-500					
J.Chg.R.	325.6	15.1								21060	2.92	21050	2.92	
Chg.R.	325.6	15.1	-	490	-	-	-	-	-	-	-	20910	7.95	
9+Chg.R.	325.6	15.1	0.191	1820	42310	-4850	+800	+2660	-1390					
12	324.3	16.4								40920	4.15	40410	4.10	
12	324.3	16.4	0.216	1830	40410	-5540	+1040	-5370	-9860					
13	322.8	17.9								30540	3.09	30600	3.10	
13	322.8	17.9	0.379	1850	30600	-9990	+2740	+11870	+4620					
14	320.0	20.7								35220	3.47	34990	3.45	
14	320.0	20.7	0.346	1870	34990	-10390	+3690	+4170	-2530					
15	317.3	23.4								32460	3.19	28570	2.81	
15	317.3	23.4	0.195	1880	28570	-6170	+2270	-	-3900					
WSWP	315.8	24.9								24670	2.43	-	-	
WSWP	315.8	24.9	-	1360	-	-	-	-	-	-	-	46200	6.30	
15+WSWP	315.8	24.9	0.138	3200	67040	-14270	+3100	-570	-11740					
16	314.0	26.7								55300	3.19	48110	2.78	
16	314.0	26.7	0.479	3210	48110	-44710	+13480	-3000	-34230					
17	307.9	32.8								13880	0.80	14050	0.81	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JUNE, 1961 TABLE NO. IX-7c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
17	307.9	32.8	0.268	3210	14050	-16310	+4150	+14060	+1900					
18	304.1	36.6								15950	0.92	16150	0.93	
18	304.1	36.6	0.055	3220	16150	-2780	+690	-	-2090					
J.Cal.Sag.	303.4	37.3								14060	0.81	14060	0.81	
Cal.Sag.	303.4	37.3	-	545	-	-	-	-	-	-	-	7260	2.47	
18+CalSag	303.4	37.3	0.204	3760	21320	-12380	+2750	+2850	-6780					
19	300.5	40.2								14540	0.71	14660	0.72	
19	300.5	40.2	0.290	3780	14660	-15250	+4680	+3880	-6690					
20	296.2	44.5								7960	0.39	7970	0.39	
20	296.2	44.5	0.306	3790	7970	-13980	+7290	+21310	+14620					
21	292.1	48.6								22580	1.10	19050	0.93	
21	292.1	48.6	0.090	3800	19050	-3960	+1290	-5690	-8360					
22	291.1	49.6								10700	0.52	10690	0.52	
22	291.1	49.6	0.076	3810	10690	-3190	+2440	-	-750					
J.DesPl.	290.0	50.7								9940	0.48	9870	0.48	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-8a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult. BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
1	340.7		0.143	605	15060	-1765	-590	-2355					(1)
2	338.6	2.1							12705	3.89	12740	3.90	
2	338.6	2.1	0.095	610	12845	+2670	-395	+2275					
3	336.9	3.8							15120	4.59	15150	4.60	
3	336.9	3.8	0.017	610	15150	-	-65	-65					
NSP	336.6	4.1							15085	4.58	-	-	
NSP	336.6	4.1	-	400	-	-	-	-	-	-	19485	9.02	
3+NSP	336.6	4.1	0.058	1010	34570	-9545	-545	-10090					
4	334.9	5.8							24480	4.49	24490	4.49	
4	334.9	5.8	0.057	1010	24490	+4910	-490	+4420					
5	333.4	7.3							28910	5.30	28905	5.30	
N.Br.,6	333.4	7.3	-	30	-	-	-	-	-	-	1840	11.36	
5+6	333.4	7.3	0.122	1040	30745	-1065	-1125	-2190					
7	331.4	9.3							28555	5.08	28475	5.07	
7	331.4	9.3	0.281	1060	29020	+13450	-3150	+10300					
8	329.0	11.7							39320	6.87	39380	6.88	
8	329.0	11.7	0.458	1060	39380	+5380	-5895	-515					
9	325.8	14.9							38865	6.79	38865	6.79	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-8b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
9	325.8	14.9	0.040	1070	39235	-	-520	-520					
J.Chg.R.	325.6	15.1							38715	6.70	-	-	
Chg.R.	325.6	15.1	-	680	-	-	-	-	-	-	12780	3.48	
9+Chg.R	325.6	15.1	0.198	1750	51495	-5290	-3025	-8315					
12	324.3	16.4							43180	4.57	43185	4.57	
12	324.3	16.4	0.224	1760	43435	+3420	-3135	+285					
13	322.8	17.9							43720	4.60	43720	4.60	
13	322.8	17.9	0.394	1780	44215	+16535	-6630	+9905					
14	320.0	20.7							54120	5.63	54115	5.63	
14	320.0	20.7	0.360	1800	54725	+10690	-7485	+3205					
15	317.3	23.4							57930	5.96	57930	5.96	
15	317.3	23.4	0.204	1800	57930	-	-4375	-4375					
WSWP	315.8	24.9							53555	5.51	-	-	
WSWP	315.8	24.9	-	1345	-	-	-	-	-	-	100015	13.78	
15+WSWP	315.8	24.9	0.141	3130	153570	+85860	-10815	+75045					
16	214.0	26.7							228615	13.53	228685	13.53	
16	314.0	26.7	0.491	3130	228685	+15210	-44115	-28905					
17	307.9	32.8							199780	11.82	199950	11.83	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-8c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
17	307.9	32.8	0.275	3130	199950	-44450	-19100	-63550					
18	304.1	36.6							136400	8.07	136570	8.08	
18	304.1	36.6	0.056	3130	136570	-	-3210	-3210					
J.CalSag	303.4	37.3							133360	7.89	-	-	
Cal.Sag.	303.4	37.3	-	625	-	-	-	-	-	-	22750	6.74	
18+CalSag	303.4	37.3	0.203	3780	156110	+18985	-13675	+5310					
19	300.5	40.2							161420	7.91	161460	7.91	
19	300.5	40.2	0.290	3780	161460	-15920	-17965	-33885					
20	296.2	44.5							127575	6.25	127575	6.25	
20	296.2	44.5	0.307	3780	127575	+38375	-18575	+19800					
21	292.1	48.6							147375	7.22	147580	7.23	
21	292.1	48.6	0.090	3780	147580	+1020	-5715	-4695					
22	291.1	49.6							142885	7.00	142885	7.00	
22	291.1	49.6	0.076	3790	143260	-	-4705	-4705					
J.DesPl.	290.0	50.7							138555	6.77	-	-	

(1) All ultimate BOD values were calculated with $K_1, 20^0C = 0.139\ da^{-1}$

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-9a STREAM: UPPER ILLINOIS WATERWAY

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No. 1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Rmks.
1	340.7		0.143	605	32900	-590	-125	+295	-420					
2	338.6	2.1								32480	9.94	32410	9.92	
2	338.6	2.1	0.095	610	32675	-395	0	-2010	-2405					
3	336.9	3.8								30270	9.19	30010	9.11	
3	336.9	3.8	0.017	610	30010	-65	+15	-	-50					
NSP	336.6	4.1								29960	9.10	-	-	
NSP	336.6	4.1	-	400	-	-	-	-	-	-	-	16200	7.50	
3+NSP	336.6	4.1	0.058	1010	46160	-545	+375	-3600	-3770					
4	334.9	5.8								42390	7.77	42160	7.73	
4	334.9	5.8	0.057	1010	42160	-490	+485	-3600	-3605					
5	333.4	7.3								38555	7.07	37525	6.88	
N.Br.,6	333.4	7.3	-	30	-	-	-	-	-	-	-	1095	6.76	
5 + 6	333.4	7.3	0.122	1040	39650	-1125	+1505	-7695	-7315					
7	331.4	9.3								32335	5.76	30665	5.46	
7	331.4	9.3	0.281	1060	31255	-3150	+2085	-15170	-16235					
8	329.0	11.7								15020	2.62	13965	2.44	
8	329.0	11.7	0.458	1060	13965	-5895	+3640	-5495	-7750					
9	325.8	14.9								6215	1.09	5780	1.01	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-9b STREAM: UPPER ILLINOIS WATERWAY

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No. 1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Rmks.
9	325.8	14.9	0.040	1070	5835	-520	+180	-	-340					
J.Chg.R	325.6	15.1								5495	.95	-	-	
Chg.R	325.6	15.1	-	680	-	-	-	-	-	-	-	26550	7.23	
9+Chg.R	325.6	15.1	0.198	1750	32045	-3025	+895	+850	-1280					
12	324.3	16.4								30765	3.26	30335	3.21	
12	324.3	16.4	0.224	1760	30510	-3135	+1080	-950	-3005					
13	322.8	17.9								27505	2.89	26800	2.82	
13	322.8	17.9	0.394	1780	27105	-6630	+2835	+2980	-815					
14	320.0	20.7								26290	2.74	23550	2.45	
14	320.0	20.7	0.360	1800	23815	-7485	+4050	+485	-2950					
15	317.3	23.4								20865	2.15	17980	1.85	
15	317.3	23.4	0.204	1800	17980	-4375	+2380	-	-1995					
WSWP	315.8	24.9								15985	1.64	-	-	
WSWP	315.8	24.9	-	1345	-	-	-	-	-	-	-	42820	5.90	
15+WSWP	315.8	24.9	0.141	3130	58805	-10815	+3220	-11155	-18750					
16	314.0	26.7								40055	2.37	32790	1.94	
16	314.0	26.7	0.491	3130	32790	-44115	+14270	+7015	-26830					
17	307.9	32.8								3960	0.23	5750	0.35	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: JULY, 1961 TABLE NO. IX-9c STREAM: UPPER ILLINOIS WATERWAY

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No. 1	Time of Travel da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B.Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Rmks.
17	307.9	32.8												
			0.275	3130	5750									
18	304.1	36.6				-19100	+4365	+12000	-2735					
										3015	0.18	2535	0.15	
18	304.1	36.6			2535									
			0.056	3130		-3210	+735	-	-2475					
J. CalSag	303.4	37.3								60	0.004			
Cal Sag	303.4	37.3		625	-	-	-	-	-	-	-	8710	2.58	
18+CalSag	303.4	37.3			8770									
			0.203	3780		-13675	+3025	+10000	-650					
19	300.5	40.2								8120	0.40	6330	0.31	
			0.290	3780	6330									
20	296.2	44.5				-17965	+4780	+10555	-2630					
										3700	0.18	4285	0.21	
20	296.2	44.5			4285									
21	292.1	48.6	0.307	3780		-18575	+7385	+22250	+11060					
										15345	0.75	13880	0.68	
21	292.1	48.6			13880									
			0.090	3780		-5715	+1300	-410	-4825					
22	291.1	49.6								9055	0.44	8370	0.41	
					8390									
J. DesPl	290.0	50.7	0.076	3790		-4705	+2440	-	-2265					
										6125	0.30	-	-	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: AUGUST, 1961 TABLE NO. IX-10a STREAM: Upper Illinois Waterway

Reach Sta.A to Sta.B	Mileage Index	Miles from Sta. No.1	Time of travel, days	Flow cfs	A Meas. Ult. BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
1	340.7		.145	590	10990	-2730	-405	-2325					(1)
2	338.6	2.1		600					7855	2.42	7970	2.46	
2	338.6	2.1	.096	600	7970	+4900	-300	+4600					
3	336.9	3.8		610					12570	3.81	12720	3.86	
3	336.9	3.8	.017	610	12720	-	-70	-70					
NSP	336.6	4.1		610					12650	3.83	-	-	
NSP	336.6	4.1	-	420	-	-	-	-	-	-	29820	13.15	
3+NSP	336.6	4.1	.057	1030	42470	-10175	-840	-11015					
4	334.9	5.8		1030					31455	5.66	31590	5.68	
4	334.9	5.8	.055	1030	31590	-2920	-515	-3435					
5	333.4	7.3		1040					28155	5.01	28410	5.06	
N.Br.,6	333.4	7.3	-	25	-	-	-	-	-	-	945	7.00	
5 + 6	333.4	7.3	.117	1065	29360	-230	-1190	-1420					
7	331.4	9.3		1090					27940	4.74	28680	4.87	
7	331.4	9.3	.270	1090	28665	+10630	-2930	+7700					
8	329.0	11.7		1100					36365	6.12	36530	6.15	
8	329.0	11.7	.437	1100	36530	-1980	-4760	-6740					
9	325.8	14.9		1120					29790	4.92	30250	5.00	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERION: AUGUST, 1961 TABLE NO. IX-10b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of travel, days	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
9	325.8	14.9	.038	1120	30240	-	-420	-420					
J.Chg.R.	325.6	15.1		1120					29820	4.93	-	-	
Chg.R.	325.6	15.1	-	565	-	-	-	-	-	-	8030	2.63	
9+Chg.R.	325.6	15.1	.205	1685	37850	-5290	-2550	-7840					
12	324.3	16.4		1700					30010	3.27	30200	3.29	
12	324.3	16.4	.230	1700	30200	+5200	-2430	+2770					
13	322.8	17.9		1740					32970	3.51	33460	3.56	
13	322.8	17.9	.398	1740	33450	+21000	-5760	+15240					
14	320.0	20.7		1780					48870	5.09	49110	5.11	
14	320.0	20.7	.363	1780	49120	+28550	-8320	+20230					
15	317.3	23.4		1790					69350	7.17	69140	7.15	
15	317.3	23.4	.205	1790	69110	-	-6000	-6000					
WSWP	315.8	24.9		1790					63110	6.53	-	-	
WSWP	315.8	24.9	-	1420	-	-	-	-	-	-	97470	12.73	
15+WSWP	315.8	24.9	.138	3140	160590	+4810	-9040	-4230					
16	314.0	26.7		3190					156360	9.07	155415	9.02	
16	314.0	26.7	.481	3190	155380	-5510	-27390	-32900					
17	307.9	32.8		3190					122480	7.11	119230	6.92	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: AUGUST, 1961 TABLE NO. IX-10c STREAM: Upper Illinois Waterway

Reach Sta A to Sta B	Mileage Index	Miles from Sta. No.1	Time of travel, days	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
17	307.9	32.8	.269	3190	119200	-9680	-11660	-21340					
18	304.1	36.6		3200					97860	5.66	96770	5.60	
18	304.1	36.6	.055	3200	96770	-	-2620	-2620					
J.Cal.Sag	303.4	37.3		3200					94150	5.45	-	-	
Cal.Sag	303.4	37.3	-	655	-	-	-	-	-	-	13070	3.70	
18+Cal.Sag	303.4	37.3	.200	3855	106560	+40540	-11120	+29420					
19	300.5	40.2		3850					135980	6.54	137010	6.59	
19	300.5	40.2	.285	3850	137010	-4160	-15030	-19190					
20	296.2	44.5		3850					117820	5.67	116220	5.59	
20	296.2	44.5	.302	3850	116220	+19910	-15365	+4545					
21	292.1	48.6		3840					120765	5.82	118840	5.73	
21	292.1	48.6	.088	3840	118820	+2280	-4505	-2225					
22	291.1	49.6		3840					116595	5.62	116140	5.60	
22	291.1	49.6	.075	3840	116120	-	-4155	-4155					
J.Des Pl.	290.0	50.7		3840					11965	5.40	-	-	.1

(1) All ultimate BOD values were calculated with K_1, 20°C = 0.139 da.

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: AUGUST, 1961 TABLE NO. IX-11a STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles frcm Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaer-ation A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
1	340.7		.145	590	28760	-405	+40	-640	-1005					
2	338.6	2.1		600						27755	8.57	28220	8.71	
2	338.6	2.1	.096	600	28220	-300	+175	-3135	-3260					
3	336.9	3.8		610						24960	7.58	25305	7.68	
3	336.9	3.8	.017	610	25305	-75	+55	-	-20					
NSP	336.6	4.1		610						25285	7.67	-	-	
NSP	336.6	4.1	-	420	-	-	-	-	-	-	-	15890	7.0	
3+NSP	336.6	4.1	.057	1030	41175	-840	+580	-3670	-3930					
4	334.9	5.8		1030						37245	6.70	36750	6.61	
4	334.9	5.8	.055	1030	36750	-515	+640	-3425	-3300					
5	333.4	7.3		1040						33450	5.96	33745	6.01	
N.Br.,6	333.4	7.3	-	25	-	-	-	-	-	-	-	965	7.16	
5+6	333.4	7.3	.117	1065	34710	-1185	+1915	-11140	-10410					
7	331.4	9.3		1090						24300	4.13	24500	4.16	
7	331.4	9.3	.270	1090	24500	-2925	+2475	-13365	-13815					
8	329.0	11.7		1100						10685	1.80	9445	1.59	
8	329.0	11.7	.437	1100	9445	-4760	+4055	-6395	-7600					
9	325.8	14.9		1120						1845	0.30	1575	0.26	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: AUGUST, 1961 TABLE NO. IX-11b STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Rmks.
9	325.8	14.9	.038	1120	1575	-420	+200	-	-220					
J. Chg.R.	325.6	15.1		1120						1355	0.22	-	-	
Chgo.R.	325.6	15.1	-	565	-	-	-	-	-	-	-	20800	6.82	
9+Chg.R.	325.6	15.1	.205	1685	22115	-2545	+925	+8580	+6960					
12	324.3	16.4		1700						29075	3.17	28735	3.13	
12	324.3	16.4	.230	1700	28735	-2430	+1140	-11515	-12805					
13	322.8	17.9		1740						15930	1.69	16355	1.74	
13	322.8	17.9	.398	1740	16355	-5760	+3125	+6275	+3640					
14	320.0	20.7		1780						19995	2.08	18740	1.95	
14	320.0	20.7	.363	1780	18740	-8320	+4370	-1920	-5870					
15	317.3	23.4		1790						12870	1.33	8120	0.84	
15	317.3	23.4	.205	1790	8120	-6000	+2695	-	3305					
WSWP	315.8	24.9		1790						4815	0.50	-	-	
WSWP	315.8	24.9	-	1420	-	-	-	-	-	-	-	48225	6.30	
15+WSWP	315.8	24.9	.138	3140	51900	-9040	+3265	-10130	-15905					
16	314.0	26.7		3190						35995	2.09	30670	1.78	
16	314.0	26.7	.481	3190	30670	-27390	+14030	-7580	-20940					
17	307.9	32.8		3190						9730	0.56	9305	0.54	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: AUGUST, 1961 TABLE NO. IX-11c STREAM: Upper Illinois Waterway

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel, da.	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaer-ation A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Rmks
17	307.9	32.8	.269	3190	9305	-11655	+4180	+1900	-5575					
18	304.1	36.6		3200						3730	0.22	6395	0.37	
18	304.1	36.6	.055	3200	6395	-2620	+710	-	-1910					
J.Cal.Sag.	303.4	37.3		3200						4485	0.26	-	-	
Cal.Sag.	303.4	37.3	-	655	-	-	-	-	-	-	-	4140	1.17	
18+Cal.Sag	303.4	37.3	.200	3855	9370	-11120	+2990	+10440	-7090					
19	300.5	40.2		3850						2280	0.11	8730	0.42	
19	300.5	40.2	.285	3850	8730	-15030	+4615	+7480	-2935					
20	296.2	44.5		3850						5795	0.28	7485	0.36	
20	296.2	44.5	.302	3850	7485	-15365	+7290	+8295	+220					
21	292.1	48.6		3840						7705	0.37	8295	0.40	
21	292.1	48.6	.088	3840	8295	-4505	+1295	+3525	+315					
22	291.1	49.6		3840						8610	0.42	8710	0.42	
22	291.1	49.6	.075	3840	8710	-4155	+2355	-	-1800					
J.Des.Pl.	290.0	50.7		3840						6910	0.33	-	-	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-12a STREAM: Upper Illinois River System

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No. 1	Time of Travel for Reach	Flow cfs	A Meas. Ult. BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult. BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
1	304.7		1.082	80	890	+290	-140	+150					
2	338.6	2.1							1040	2.41	1050	2.43	
2	338.6	2.1	0.684	85	1120	+1200	-150	+1050					
3	336.9	3.8							2170	4.73	2180	4.74	
3	336.9	3.8	0.121	85	2180	-	-30	-30					
NSP	336.6	4.1							2150	4.68	-	-	
NSP	336.6	4.1	-	390	-	-	-	-	-	-	29560	14.07	
3+NSP	336.6	4.1	0.124	470	31710	-50	-660	-710					
4	334.9	5.8							31000	12.21	30990	12.21	
4	334.9	5.8	0.121	475	31320	-3410	-590	-4000					
5	333.4	7.3							27320	10.65	27320	10.65	
N.Br.,6	333.4	7.3	-	85	-	-	-	-	-	-	3590	7.83	
5+6	333.4	7.3	0.224	565	30910	-2200	-1040	-3240					
7	331.4	9.3							27670	9.07	27670	9.07	
7	331.4	9.3	0.522	570	27920	-1170	-2190	-3360					
8	329.0	11.7							24560	7.98	24560	7.98	
8	329.0	11.7	0.838	580	24990	-1910	-2940	-4850					
9	325.8	14.9							20140	6.43	20170	6.44	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-12b STREAM: Upper Illinois River System

Reach No. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel for Reach	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
	325.8	14.9	0.073	585	20340	-	-220	-220					
J.Chg.R	325.6	15.1							20120	6.37	-	-	
Chg. R.	325.6	15.1	-	675	-	-	-	-	-	-	10020	2.75	
S.Chg.R	325.6	15.1	0.275	1260	30140	-1970	-1090	-3060					
12	324.3	16.4							27080	3.98	27080	3.98	
12	324.3	16.4	0.311	1270	27300	+1510	-1170	+340					
13	322.8	17.9							27640	4.03	27570	4.02	
13	322.8	17.9	0.548	1280	27790	+7470	-2280	+5190					
14	320.0	20.7							32980	4.77	32970	4.77	
14	320.0	20.7	0.501	1290	33230	+17690	-3070	+14620					
15	317.3	23.4							47850	6.87	47930	6.88	
15	317.3	23.4	0.284	1290	47930	-	-2300	-2300					
WSWP	315.8	24.9							45630	6.55	-	-	
WSWP	315.8	24.9	-	1260	-	-	-	-	-	-	140500	20.65	
15+WSWP	315.8	24.9	0.174	2530	186130	+6560	-6290	+270					
16	314.0	26.7							186400	13.64	186350	13.64	
16	314.0	26.7	0.607	2530	186350	-20490	-19670	-40160					
17	307.9	32.8							146190	10.70	146180	10.70	

BIOCHEMICAL OXYGEN DEMAND BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-12c STREAM: Upper Illinois River System

Reach Sta.A to Sta.B	Mileage Index	Miles from Sta. No.1	Time of Travel for Reach	Flow cfs	A Meas. Ult.BOD lb./da.	Calc. Midpoint Load lb./da.	Flowing Ult.BOD A to B lb./da.	Change BOD A to B lb./da.	B Calc. Ult. BOD lb./da.	B Calc. BOD mg/l	B Meas. Ult. BOD lb./da.	B Meas. BOD mg/l	Remarks
17	307.9	32.8	0.338	2540	146760	-8780	-8780	-17560					
18	304.1	36.6							129200	9.42	129360	9.43	
18	304.1	36.6	0.069	2540	129340	-	-1650	-1650					
J.CalSag	303.4	37.3							127690	2.31	-	-	
Cal.Sag	303.4	37.3	-	675	-	-	-	-	-	-	22200	6.09	
18+Cal Sag	303.4	37.3	0.240	3210	149890	+3120	-6410	-3290					
19	300.5	40.2							146600	8.46	146820	8.47	
19	300.5	40.2	0.343	3200	146360	-6590	-8640	-15230					
20	296.2	44.5							131130	7.59	131330	7.60	
20	296.2	44.5	0.363	3200	131330	-11230	-7950	-19180					
21	292.1	48.6							112150	6.49	111970	6.48	
21	292.1	48.6	0.106	3200	111970	+2070	-2070	0					
22	291.1	49.6							111970	6.48	111970	6.48	
22	291.1	49.6	0.090	3200	111970	-	-1730	-1730					
J.DesPl.	290.0	50.7							110240	6.38	-	-	
(1) All ultimate BOD values were calculated with K_1, 20° C =								0.139 da.$^{-1}$					

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-13a STREAM: Upper Illinois River System

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel for Reach	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaer-ation A to B lb./da.	Diff. Meas. (-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B.Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
1	340.7		1.082	80	6360	-140	+20	-170	-290					
2	338.6	2.1								6070	14.05	5980	13.85	
2	338.6	2.1	0.684	85	6360	-150	+90	-700	-760					
3	336.9	3.8								5600	12.20	5640	12.28	
3	336.9	3.8	0.121	85	5640	- 30	+30	-	0					
NSP	336.6	4.1								5640	12.29	-	-	
NSP	336.6	4.1	-	390	-	-	-	-	-	-	-	24330	11.58	
3+NSP	336.6	4.1	0.124	470	29770	-660	+330	-6190	-6520					
4	334.9	5.8								23250	9.16	22740	8.96	
4	334.9	5.8	0.121	475	22980	-590	+530	-1000	-1060					
5	333.4	7.3								21920	8.55	21910	8.54	
N.BR.6	333.4	7.3	-	85	-	-	-	-	-	-	-	3120	6.79	
5+6	333.4	7.3	0.224	565	25030	-1040	+1600	-5130	-4570					
7	331.4	9.3								20460	6.71	20170	6.61	
7	331.4	9.3	0.522	570	20350	-2190	+1640	-2920	-3470					
8	329.0	11.7								16880	5.48	16840	5.47	
8	329.0	11.7	0.838	580	17130	-2940	+2050	+3070	+2180					
9	325.8	14.9								19310	6.17	20450	6.53	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-13b STREAM: Upper Illinois River System

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel for Reach	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaeration A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
9	325.8	14.9	0.073	585	20630	-220	+90	-	-130					
J.Chg.R	325.6	15.1								20500	6.49	-	-	
Chg.R	325.6	15.1	-	675	-	-	-	-	-	-	-	46840	12.85	
9+ChgR	325.6	15.1	0.275	1260	67340	-1090	+370	+3810	+3090					
12	324.3	16.4								70430	10.35	71580	10.52	
12	324.3	16.4	0.311	1270	72150	-1170	+420	+2200	+1450					
13	322.8	17.9								73600	10.73	71870	10.48	
13	322.8	17.9	0.548	1280	72440	-2280	+860	+3110	+1690					
14	320.0	20.7								74130	10.72	69120	10.00	
14	320.0	20.7	0.501	1290	69660	-3070	+1200	+1950	-80					
15	317.3	23.4								69580	9.99	65550	9.41	
15	317.3	23.4	0.284	1290	65550	-2300	+720	-	-1580					
WSWP	315.8	24.9								63970	9.18	-	-	
WSWP	315.8	24.9	-	1260	-	-	-	-	-	-	-	76070	11.18	
15+WSWP	315.8	24.9	0.174	2530	140040	-6290	+830	-24050	-29510					
16	314.0	26.7								110530	8.09	104100	7.62	
16	314.0	26.7	0.607	2530	104100	-19670	+6280	-5470	-18860					
17	307.9	32.8								85240	6.24	91130	6.67	

DISSOLVED OXYGEN BALANCE SUMMARY

SAMPLING PERIOD: January 1962 TABLE NO.: IX-13c STREAM: Upper Illinois River System

Reach Sta. A to Sta. B	Mileage Index	Miles from Sta. No.1	Time of Travel for Reach	Flow cfs	A Meas. DO lb./da.	Flowing BOD A to B lb./da.	Reaer-ation A to B lb./da.	Diff. Meas.(-) Calc. at B Sta. lb./da.	Change DO A to B lb./da.	B Calc. DO lb./da.	B Calc. DO mg/l	B Meas. DO lb./da.	B Meas. DO mg/l	Remarks
17	307.9	32.8			91490									
			0.338	2540		-8780	+2080	-2200	-8900					
18	304.1	36.6								82590	6.02	83390	6.08	
18	304.1	36.6			83390									
			0.069	2540		-1650	+370	-	-1280					
J.Cal.Sag.	303.4	37.3								82110	5.99	--	--	
Cal.Sag.	303.4	37.3	-	675	--	-	--	-	-	-	-	19500	5.35	
18+Cal.Sag	303.4	37.3			101610									
			0.240	3210		-6410	+1800	-4160	-8770					
19	300.5	40.2								92840	5.36	90830	5.24	
19	300.5	40.2			90550									
			0.343	3200		-8640	+2890	-10020	+4270					
20	296.2	44.5								94820	5.49	91070	5.27	
20	296.2	44.5			91070									
			0.363	3200		-7950	+4510	-350	-3790					
21	292.1	48.6								87280	5.05	95210	5.51	
21	292.1	48.6			95210									
			0.106	3200		-2070	+830	-10890	-12130					
22	291.1	49.6								83080	4.81	85020	4.92	
22	291.1	49.6			85020									
			0.090	3200		-1730	+1600	-	-130					
J.DesPl.	290.0	50.7								84890	4.91	-	-	

TABLE NO IX-14

SUMMARY OF ASSETS AND LIABILITIES IN UPPER ILLINOIS RIVER SYSTEM MAINSTEM

STUDY PERIOD	ASSETS			LIABILITIES				STATION 22(LOCKPORT)	
	Tributary DO lb/da	Reaeration DO lb/da	Est. DO added lb/da	Known BOD Loads lb/da	Estimated Midstation BOD Loads lb/da	Estimated Bottom Sludge Oxygen Demand lb/da	Est. Flowing BOD Satisfied lb/da	DO lb/da	BOD lb/da
April-May, 1961	153 680	51 050	32 630	195 550	158 600	56 990	141 120	22 550	144 510
June, 1961	143 920	56 860	61 360	255 300	233 400	49 250	181 570	10 690	153 320
July, 1961	128 280	60 920	60 430	171 930	216 510	50 090	175 300	8 390	143 260
August, 1961	118 780	63 120	37 100	160 330	137 820	73 420	137 380	8 710	116 120
January, 1962	176 220	31 140	24 160	206 760	39 910	63 230	81 060	85 020	111 970
Totals	720 880	263 090	215 680	989 870	786 240	292 980	716 430	135 360	669 180
Averages	144 180	52 620	43 140	197 970	157 250	58 600	143 290	27 070	133 840

TABLE NO. IX-15

STORM SPILLAGE, INDUSTRIAL WASTE, AND MID-LOAD ESTIMATES
COMPARISONS FOR UPPER ILLINOIS RIVER SYSTEM MAINSTEM

I. Storm Spillage:

Based on study of 31 storms in 1961-1962 in Roscoe Street Sewer

Average 5-day BOD per day to Canal System = 1012 pounds/day

Average 5-day BOD per day per sq. mile = $\frac{1012}{8.62}$ = 117.6 pounds
5-da BOD

Drainage Area	Average 5-day BOD	Ratio	Drainage Area sq. miles	Pounds of 5-day BOD spilled	
				pounds/sq. mile	pounds total
NSSTP	86	1.0	76	117.6	8,940
WSWSTP	156	1.8	127.2	212.0	27,000
Calumet STP	113	1.3	53.0	153.0	8,100
					37,940

Total pounds 5-day BOD into mainstem = 37,940 pounds/day

Lu, ultimate BOD = $\frac{37,940}{0.68}$ = 56,000 pounds/day spilled into mainstem

II. Industrial wastes spilled into mainstem = 54,300 pounds Lu, ultimate BOD/day

III. Calculate mid-station positive BOD loads, average for 5 study periods = 157,250 pounds Lu, ultimate BOD/day

IV. Comparison:

Sum of Storm Spillage and Industrial Waste spillage = 56,000 plus 54,300 = 110,300 pounds/day

Ratio = $\frac{110,300}{157,250}$ = 70%

TABLE NO. IX -16

k_1 VALUES THOMAS SLOPE METHOD

STATION REACH				
STATION	STATION	STATION	STATION	STATION
1,2,3,	4,5,7,8,9	12,13,14,15	16,17,18	19,20,21,22
.106	.135	.128	.212	.230
.252	.112	.189	.192	.092
.071	.247	.088	.075	.166
.215	.131	.061	.090	.071
.105	.213	.099	.096	.192
.109				
.109				
n = 8	n = 6	n = 7	n = 5	n = 5
1.057	.920	.931	.665	.751
$\bar{k}_1$=0.132	$\bar{k}_1$=0.153	$\bar{k}_1$=0.133	$\bar{k}_1$=0.133	$\bar{k}_1$=0.150

n = 31

$\bar{k}_1$ = 0.139

s(x) = 0.061

TABLE NO. IX-17

Lower Illinois River System - FLOW - CFS

Station Mileage	Location	Study Periods - Averages Nov. '61	Mar. '62	July '62	Average
280.8 T	DuPage R. (Trib)	435	1250	95	595
278.7 T	Kankakee R. (Trib)	4960	13400	2180	6845
271.6	Dresden Dam	8760	22600	6620	8045
270.6	E.J.&E. RR. Bdg.	8760	22600	6620	12660
263.5	Morris Hwy. Bg.	9160	25100	6770	13675
252.7	Seneca Hwy. Bg.	9180	25400	6770	13785
246.9 (1)	Marseilles-Rapid	8990	25600	6670	13755
246.9 (2)	Marseilles Canal	200	15	100	105
240.2	Sherer Island	9240	25600	6780	13875
241.1 T	Fox R. (Trib)	3470	7300	720	3830
239.2	Hitt Island	12700	32900	7500	17700
231.6	Starved Rock	12900	33200	7530	17875
229.7	Utica Bg. Light	12900	33200	7530	17875
236.5 T	Vermillion R. (Trib)	965	3920	600	1830
219.8	Huse Slough	14100	38100	8270	20155
209.4	Bureau Creek	14300	38300	8390	20330
198.1	Webster Ldg.	15000	40100	8750	21285
184.8	Bennett's Lt.	15300	40100	8870	21425
181.3	Chilicothe Lt.	15500	40100	8940	21515
173.4	Blue Crk Lt.	15700	40100	9110	21635
168.9	Drolls Pt. Lt.	15800	39400	9140	21445
166.1	Peoria W. Intake	15900	39200	9170	21425
165.3	Avery Light	15900	39200	9170	21425
161.7 T	Kickapoo Ck. (Trib)	205	580	135	310
158.7	Warn Sign	16200	38600	9340	21380
156.5	Seven Mile Lt.	16200	38600	9340	21380
161.0 T	Mackinaw R. (Trib)	960	3460	630	1685
151.8	Pekin Intake	16300	38700	9380	21460
143.2	Lancaster Lt.	17400	42700	10100	23400
132.0	Woodyard Lt.	17800	41700	10100	23200
125.8	Thompson Lt.	17900	41700	10100	23235
133.7 T	Spoon R. (Trib)	2440	5540	420	2800
117.6	Havanna Lt.	20400	46500	10500	25800
105.5	Grand Island Lt.	20700	47300	10700	26235
105.7 T	Sangamon R. (Trib)	3230	12800	2130	6055
100.9	Hickory Lt.	20800	48600	10700	26700
88.0	Beardstown Br.	24300	63200	12900	33465
95.8 T	LaMoine R. (Trib)	1960	3440	100	1835
81.0	LaGrange Mk.	26600	66300	12900	35265
78.6	Indian Ck. Lt.	26600	66300	13000	35300
71.2	Meridosia Bge.	26800	65800	13000	35200
55.9	Flo-Hwy. Bge.	N.S.	N.S.	N.S.	N.S.
23.7 T	Macpn. Ck. Bge. (Trib)	N.S.	N.S.	N.S.	N.S.
21.7	Hardin Hwy. Bge.	N.S.	N.S.	N.S.	N.S.

N.S. = NOT SAMPLED

1K6

TABLE NO. IX -18

Lower Illinois River System - B O D 5 DAY MG/L

Station		Study Periods - Averages			
Mileage	Location	Nov. '61	Mar. '62	July '62	Average
280.8 T	DuPage R. (Trib)	2.25	3.94	7.5	4.56
278.7 T	Kankakee R. (Trib)	2.11	3.68	4.8	3.53
271.6	Dresden Dam	2.83	4.85	6.1	4.59
270.6	E.J.&E. RR. Bdg.	3.15	5.26	6.3	4.90
263.5	Morris Hwy. Bg.	3.62	4.79	7.4	5.27
252.7	Seneca Hwy. Bg.	3.16	4.22	8.1	5.16
246.9 (1)	Marseilles-Rapid	3.02	4.91	7.4	5.11
246.9 (2)	Marseilles Canal	3.55	N.S.	N.S.	3.55
240.2	Sherer Island	5.65	6.65	12.2	9.42
241.1 T	Fox R. (Trib)	4.42	4.94	10.3	5.65
239.2	Hitt Island	5.01	6.28	12.4	7.90
231.6	Starved Rock	5.06	6.47	11.8	7.77
229.7	Utica Bg. Light	4.57	6.66	11.2	7.47
236.5 T	Vermillion R. (Trib)	2.13	2.70	5.2	3.34
219.8	Huse Slough	N.S.	N.S.	N.S.	N.S.
209.4	Bureau Creek	4.61	5.84	12.8	7.75
198.1	Webster Ldg.	N.S.	N.S.	N.S.	N.S.
184.8	Bennett's Lt.	5.02	4.96	11.4	7.13
181.3	Chilicothe Lt.	N.S.	N.S.	N.S.	N.S.
173.4	Blue Crk Lt.	5.67	4.16	10.8	6.88
168.9	Drolls Pt. Lt.	N.S.	N.S.	N.S.	N.S.
166.1	Peoria W. Intake	5.49	4.29	8.2	5.99
165.3	Avery Light	N.S.	N.S.	N.S.	N.S.
161.7 T	Kickapoo Ck. (Trib)	3.05	4.18	3.9	3.71
158.7	Warn Sign	4.53	4.22	8.5	5.75
156.5	Seven Mile Lt.	4.40	3.95	8.3	5.55
161.0 T	Mackinaw R. (Trib)	3.54	3.82	4.3	3.89
151.8	Pekin Intake	N.S.	N.S.	N.S.	N.S.
143.2	Lancaster Lt.	5.26	4.51	8.9	6.22
132.0	Woodyard Lt.	N.S.	N.S.	N.S.	N.S.
125.8	Thompson Lt.	4.84	4.57	9.5	6.30
133.7 T	Spoon R. (Trib)	3.60	5.95	5.0	4.85
117.6	Havanna Lt.	N.S.	N.S.	N.S.	N.S.
105.5	Grand Island Lt.	4.39	4.46	8.9	5.92
105.7	Sangamon R. (Trib)	3.02	4.12	5.9	4.35
100.9	Hickory Lt.	N.S.	N.S.	N.S.	N.S.
88.0	Beardstown Br.	4.41	4.13	8.8	5.78
95.8 T	LaMoine R. (Trib)	3.31	4.63	4.0	3.98
81.0	LaGrange Mk.	4.40	4.23	8.2	5.61
78.6	Indian Ck. Lt.	4.18	3.79	8.3	5.42
71.2	Meridosia Bge.	N.S.	N.S.	7.2	7.2
55.9	Flo-Hwy. Bge.	N.S.	N.S.	7.8	7.8
23.7 T	Macpn. Ck.Bge.(Trib)	N.S.	N.S.	5.7	5.7
21.7	Hardin Hwy. Bge.	N.S.	N.S.	5.4	5.4

N.S. = NOT SAMPLED

TABLE NO. IX - 19

Lower Illinois River System - DISSOLVED OXYGEN MG/L

Station		Study Periods - Averages			
Mileage	Location	Nov. '61	Mar. '62	July '62	Average
280.8 T	DuPage R. (Trib)	11.81	11.38	6.24	9.81
278.7 T	Kankakee R. (Trib)	11.86	11.56	9.49	10.97
271.6	Dresden Dam	8.41	11.37	6.00	8.59
270.6	E.J.&E. RR. Bdg.	10.76	11.34	7.55	9.88
263.5	Morris Hwy. Bg.	10.43	11.10	7.17	9.57
252.7	Seneca Hwy. Bg.	10.17	10.84	7.46	9.49
246.9 (1)	Marseilles-Rapid	10.68	11.23	7.43	9.78
246.9 (2)	Marseilles Canal	9.75	N.S.	7.94	8.85
240.2	Sherer Island	10.20	11.21	6.85	9.42
241.1 T	Fox R. (Trib)	12.55	12.12	9.25	11.31
239.2	Hitt Island	10.46	11.26	6.93	9.55
231.6	Starved Rock	11.13	11.61	7.15	9.96
229.7	Utica Bg. Light	11.82	11.50	7.74	10.35
236.5 T	Vermillion R. (Trib)	11.79	12.14	10.94	11.62
219.8	Huse Slough	N.S.	N.S.	N.S.	N.S.
209.4	Bureau Creek	11.45	11.05	6.06	9.55
198.1	Webster Ldg.	N.S.	N.S.	N.S.	N.S.
184.8	Bennett's Lt.	11.18	10.57	4.31	8.69
181.3	Chilicothe Lt.	N.S.	N.S.	N.S.	N.S.
173.4	Blue Crk Lt.	11.36	10.68	5.38	9.14
168.9	Drolls Pt. Lt.	N.S.	N.S.	N.S.	N.S.
166.1	Peoria W. Intake	11.18	10.80	5.40	9.13
165.3	Avery Light	N.S.	N.S.	N.S.	N.S.
161.7 T	Kickapoo Ck. (Trib)	11.86	11.38	8.72	10.65
158.7	Warn Sign	11.26	10.84	5.29	9.13
156.5	Seven Mile Lt.	11.14	10.81	5.95	9.30
161.0 T	Mackinaw R. (Trib)	11.07	11.26	8.25	10.19
151.8	Pekin Intake	N.S.	N.S.	N.S.	N.S.
143.2	Lancaster Lt.	10.86	10.54	4.56	8.68
132.0	Woodyard Lt.	N.S.	N.S.	N.S.	N.S.
125.8	Thompson Lt.	10.27	10.34	3.45	8.02
133.7 T	Spoon R. (Trib)	11.41	11.01	7.56	10.02
117.6	Havanna Lt.	N.S.	N.S.	N.S.	N.S.
105.5	Grand Island Lt.	10.42	10.27	2.93	7.87
105.7 T	Sangamon R. (Trib)	10.56	10.47	7.36	9.46
100.9	Hickory Lt.	N.S.	N.S.	N.S.	N.S.
88.0	Beardstown Br.	10.18	10.05	2.63	7.62
95.8 T	LaMoine R. (Trib)	10.70	11.10	7.00	9.60
81.0	LaGrange Mk.	10.20	10.15	2.77	7.71
78.6	Indian Ck. Lt.	10.32	10.14	4.07	8.18
71.2	Meridosia Bge.	N.S.	N.S.	3.85	3.85
55.9	Flo-Hwy. Bge.	N.S.	N.S.	3.54	3.54
23.7 T	Macpn. Ck. Bge.(Trib)	N.S.	N.S.	8.62	8.62
21.7	Hardin Hwy. Bge.	N.S.	N.S.	3.57	3.57

N. S. = Not Sampled

TABLE NO. IX - 20

Lower Illinois River System - TEMPERATURE °C

Station Mileage	Location	Study Periods - Averages Nov. '61	Mar. '62	July '62	Average
280.8 T	DuPage R. (Trib)	6.6	3.0	21.9	10.5
278.7 T	Kankakee R. (Trib)	6.6	3.6	23.5	11.2
271.6	Dresden Dam	9.8	3.6	26.6	13.3
270.6	E.J.&E. RR.Bdg.	9.0	4.0	26.3	13.1
263.5	Morris Hwy. Bg.	8.7	4.1	26.1	13.0
252.7	Seneca Hwy. Bg.	8.5	4.1	25.7	12.8
246.9 (1)	Marseilles-Rapid	8.4	4.1	25.6	12.7
246.9 (2)	Marseilles Canal	8.1	N.S.	25.7	16.9
240.2	Sherer Island	7.3	7.0	25.6	13.3
241.1 T	Fox R. (Trib)	5.4	2.9	23.5	10.6
239.2	Hitt Island	7.3	6.9	25.1	13.1
231.6	Starved Rock	6.8	5.9	25.4	12.7
229.7	Utica Bg. Light	6.8	6.3	25.1	12.7
236.5 T	Vermillion R. (Trib)	6.2	4.2	23.7	11.4
219.8	Huse Slough	8.0	N.S.	N.S.	8.0
209.4	Bureau Creek	7.1	6.4	25.2	12.9
198.1	Webster Ldg.	8.5	N.S.	N.S.	8.5
184.8	Bennett's Lt.	6.9	6.2	24.9	12.7
181.3	Chillicothe Lt.	8.0	N.S.	N.S.	8.0
173.4	Blue Crk Lt.	6.1	5.8	24.1	12.0
168.9	Drolls Pt. Lt.	8.3	N.S.	N.S.	8.3
166.1	Peoria W. Intake	6.1	5.3	24.3	11.9
165.3	Avery Light	7.7	N.S.	N.S.	7.7
161.7 T	Kickapoo Ck. (Trib)	6.0	5.9	21.9	11.3
158.7	Warn Sign	5.8	5.5	24.3	11.9
156.5	Seven Mile Lt.	5.6	5.7	24.3	11.9
161.0 T	Mackinaw R. (Trib)	6.8	6.2	21.6	11.5
151.8	Pekin Intake	8.0	N.S.	N.S.	8.0
143.2	Lancaster Lt.	5.7	5.6	24.7	12.0
132.0	Woodyard Lt.	8.0	N.S.	N.S.	8.0
125.8	Thompson Lt.	5.5	5.6	24.7	11.9
133.7 T	Spoon R. (Trib)	5.7	7.0	21.4	11.4
117.6	Havanna Lt.	7.5	N.S.	N.S.	7.5
105.5	Grand Island Lt.	5.7	5.6	24.8	12.0
105.7 T	Sangamon R. (Trib)	7.0	7.7	22.6	12.4
100.9	Hickory Lt.	7.5	N.S.	N.S.	7.5
88.0	Beardstown Br.	6.0	5.6	24.9	12.2
95.8 T	LaMoine R. (Trib)	6.1	7.2	21.2	11.5
81.0	LaGrange Mk.	5.9	5.7	25.1	12.2
78.6	Indian Ck. Lt.	6.7	5.7	24.3	12.2
71.2	Meridosia Bge.	N.S.	N.S.	24.3	24.3
55.9	Flo-Hwy. Bge.	N.S.	N.S.	25.5	25.5
23.7 T	Macpn. Ck. Bge. (Trib)	N.S.	N.S.	25.0	25.0
21.7	Hardin Hwy. Bge.	N.S.	N.S.	25.9	25.9

N.S. = Not Sampled

TABLE IX-21

Lower Illinois River System - Nitrate - Nitrogen mg/l

Station Mileage	Location	Study Periods - Average Nov '61	Mar '62	July '62	Average
280.8 T	DuPage R.(Tributary)	2.20	N.S.	1.35	1.78
278.7 T	Kankakee R.(Tributary)	1.88	1.79	1.08	1.58
271.6	Dresden Dam	1.92	1.88	0.75	1.52
270.6	E.J.& E. RR. Bridge	2.05	1.84	0.90	1.60
263.5	Morris Hwy Bridge	1.97	1.95	1.01	1.64
252.7	Seneca Hwy. Bridge	2.14	1.95	1.10	1.73
246.9 (1)	Marseilles-Rapid	2.14	2.34	1.30	1.93
246.9 (2)	Marseilles-Canal	2.16	N.S.	1.19	1.68
240.2	Sherer Island	2.21	2.14	1.34	1.90
241.1 T	Fox R.(Tributary)	2.09	2.54	0.56	1.73
239.2	Hitt Island	2.02	2.02	1.39	1.81
231.6	Starved Rock	2.77	2.34	1.43	2.18
229.7	Utica Bridge Light	2.00	2.31	1.51	1.94
236.5 T	Vermillion R. (Trib)	3.80	2.61	1.76	2.72
219.8	Huse Slough	N.S.	N.S.	N.S.	N.S.
209.4	Bureau Creek	2.18	2.30	1.79	2.09
198.1	Webster Landing	N.S.	N.S.	N.S.	N.S.
184.8	Bennett's Light	2.02	2.57	1.74	2.10
181.3	Chillicothe Light	N.S.	N.S.	N.S.	N.S.
173.4	Blue Crk Light	2.14	2.44	1.84	2.14
168.9	Drolls Point Light	N.S.	N.S.	N.S.	N.S.
166.1	Peoria Water Intake	2.47	2.59	1.91	2.32
165.3	Avery Light	N.S.	N.S.	N.S.	N.S.
161.7 T	Kickapoo Ck. (Trib)	2.21	2.21	0.38	1.60
158.7	Warning Sign "D&L 1 mi"	1.94	2.64	1.80	2.13
156.5	Seven Mile Light	2.27	2.48	1.90	2.22
161.0 T	Mackinaw R.(Tributary)	2.48	3.64	1.56	2.56
151.8	Pekin Water Intake	N.S.	N.S.	N.S.	N.S.
143.2	Lancaster Light	2.03	2.77	1.79	2.20
132.0	Woodyard Light	N.S.	N.S.	N.S.	N.S.
125.8	Thompson Light	2.09	2.76	1.89	2.25
133.7 T	Spoon R. (Tributary)	2.04	2.33	0.88	1.75
117.6	Havanna Light	N.S.	N.S.	N.S.	N.S.
105.5	Grand Island Light	2.36	2.36	2.10	2.27
105.7 T	Sangamon R.(Tributary)	2.20	3.10	1.33	2.21
100.9	Hickory Light	N.S.	N.S.	N.S.	N.S.
88.0	Beardstown Bridge	2.01	2.62	2.04	2.22
95.8 T	LaMoine R.(Tributary)	2.05	1.61	0.79	1.48
81.0	LaGrange Mark	2.33	2.36	1.97	2.22
78.6	Indian Ck. Light	2.39	2.44	1.89	2.24
71.2	Meridosia Bridge	N.S.	N.S.	1.96	1.96
55.9	Flow-Hwy. Bridge	N.S.	N.S.	1.83	1.83
23.7 T	Macpn Ck. Bridge (Trib)	N.S.	N.S.	0.38	0.38
21.7	Hardin Hwy. Bridge	N.S.	N.S.	1.92	1.92

N.S. = Not Sampled